FIELD CROP ABSTRACTS

VOL. 6, Nos. 1, 2, 3 and 4

1953

Prepared by the
COMMONWEALTH BUREAU OF PASTURES AND FIELD CROPS

Published Quarterly by
Commonwealth Agricultural Bureaux, Farnham Royal, England.

FIELD CROP ABSTRACTS

SUMMARY OF CONTENTS

VOL. 6, Nos. 1, 2, 3 and 4

1953

FIELD CROPS (ANNUAL): PAGES

Cereals 1, 85, 161, 226
- Wheat
- Buckwheat
- Oats
- Rye
- Barley
- Maize
- Sweet Corn
- Millet and Sorghum
- Job's tears
- Teosinte
- General

Legumes 26, 108, 183, 243
- Soyabean
- Groundnut
- Pea
- Bean
- Lathyrus
- Chickpea
- General

Roots 30, 114, 187, 248
- Sugar-beet
- Fodder-beet
- Turnip
- Potato
- Sweet potato
- Cassava
- Jerusalem artichoke
- Taro
- Kale

Fibre Crops 43, 130, 196, 261
- Cotton
- Flax
- Hemp
- Jute
- Hibiscus
- Urena lobata
- General

Oil Crops 48, 135, 195, 267
- Sesame
- Linseed
- Safflower
- Wild safflower
- Sunflower
- Rape
- Mustard
- Xanthium
- General

PAGES

LAND USE, SURVEYS and MANAGEMENT 51, 137, 201, 268

FARMING SYSTEMS AND PRACTICES 55, 138, 203, 269

SOIL and WATER CONSERVATION 56, 140, 205, 271

WEEDS and WEED CONTROL 57, 140, 205, 272

CROP BOTANY 61, 144, 209, 275

MISCELLANEOUS 65, 146, 212, 279

BOOKS and REPORTS 70, 149, 214, 281

NEWS ITEMS and NOTES 82, 159, 223, 289

ANNUAL INDEX OF SUBJECTS ...... 291—322

ANNUAL INDEX OF AUTHORS ...... 323—331

Where † follows an abstract number in the Title Heading, it indicates that the abstract or book review is also reproduced in *Herbage Abstracts*.

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Prepared by the

COMMONWEALTH BUREAU OF PASTURES AND FIELD CROPS
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FIELD CROP ABSTRACTS

VOL. 6 No. 1, 1953

CONTENTS

PAGES

FIELD CROPS (ANNUAL) :

Cereals .... 1—26
Legumes .... 26—30
Roots .... 30—43
Fibre Crops .... 43—48
Oil Crops .... 48—51
LAND USE, SURVEYS and MANAGEMENT .... 51—55
FARMING SYSTEMS and PRACTICES .... 55—56

PAGES

SOIL and WATER CONSERVATION 56—57
WEEDS and WEED CONTROL ...... 57—61
CROP BOTANY .... 61—65
MISCELLANEOUS .... 65—70
BOOKS and REPORTS .... 70—82
NEWS ITEMS and NOTES .... 82—84
INDEX OF SUBJECTS .... v—xiv
INDEX OF AUTHORS .... xv—xvii

Individual abstracts frequently deal with more than one subject ; cross references are given in the **Subject Index** at the back of this issue.

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FIELD CROPS

CEREALS

WHEAT

1 GENTILLI, J. **Wheat yields in Western Australia.** 1950, pp. 65, W. Australia; Trustees of the Wheat Pool. [Dep. Econ., Univ. W. Aust.] [Received 1952]

This is a statistical study of trends in yields of wheat in various districts of Western Australia from the beginning of this century to 1949. It is evident that wheat yields per acre are higher now than they were at the beginning of the century, but, after a sudden rise in the 1920's, there has been a slow decline in yield per acre in many districts. As better-yielding varieties are now grown and as there is no evidence of a widespread decrease in rainfall, it is inferred that a lowering of the fertility of the soil is responsible for this decline.—K.L.

2 THOMAS, I. and CARISS, H. G. **Drill spacing and rate of seeding. Results of research station experiments.** *J. Dep. Agric. W. Aust.* 1952, **1** (3rd Ser.), No. 2, 239-41.

A series of experiments is described which compares the yields of wheat from crops sown in widely-spaced drills (i.e. at half the normal seed and fertilizer rate per ac.) with those from crops sown at normal seed and fertilizer rate and at the normal drill spacing. The experiments (which are still in progress) were carried out at five research stations in Western Australia using wheat varieties suited to local conditions. The four treatments were : A. The machine was set to sow 50 lb. of seed plus 112 lb. of superphosphate per ac. Alternate drill runs were then blocked so that the actual sowing rates were 25 lb. seed plus 56 lb. superphosphate per ac. B. The machine was set to sow 50 lb. of seed plus 112 lb. superphosphate per ac. C. The machine was set to sow 25 lb. of seed plus 56 lb. superphosphate per ac. D. The machine was set to sow 25 lb. seed plus 112 lb. superphosphate per ac. Results from experiments over the year 1951-2 showed that yields at all stations from treatment B were higher than those from treatment A, while at four stations yields from treatments B, C and D were higher than those from treatment A. It is concluded that the sowing of wheat in alternate rows will result in reduced yields compared with normal practice. It is suggested that these reduced yields may be caused by increased weed infestation in the widely spaced drills.—K.L.

3 BAUMANN, H. Wasserversorgung und Ertragsbildung. [**Water supplies and yield.**] *Z. Acker- u. Pflbau* 1951, **93,** No. 4, 497-513, bibl. 12, illus. [Univ. Berlin]

Summer wheat yields for 1947, 1949 and 1950 are studied in relation to the records for water content of the loamy sand soil of Dahlem, Berlin, expressed as curves showing the percentage weight in crumb and subsoil, respectively, during the growing season. In 1947, when there was a long period of soil drought, the same grain yield was obtained as in 1949 when soil moisture was higher. The failure of the good 1949 water supplies to produce increased yield is attributed to the damaging after-effects of a sudden change in the weather (unusually high temperature after a wet month) at the end of April. Discrepant results of watering in 1947, 1949 and 1950 are explained by the curves for soil-water content. Even in years with normal rainfall, good results (30% increase in yield) can be obtained by watering summer wheat, if this is done so as to bridge over periods of heat which set in suddenly. Pot trials show that the same grain yields can be obtained with different degrees of moisture. There can be a great saving of water if the material (in this case barley) is made more resistant to fluctuating water supplies and fungous attack by early hardening under dry conditions (30% water capacity up to the 3-leaf stage). A 9-day dry period before the formation of the first grain has proved to be the most effective means for obtaining high yield and a good constitution.—G.M.R.

4 MJAGKOV, N. V. [**The advance of hard wheat into new regions.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 9, 66-7. [Pučež, Ivanovskaja Province]

Until recently it was thought that the cultivation of hard wheat in the USSR was possible only up to the northern limit of the black-earth zone. Experiments conducted in the last few years have shown that this crop can be successfully grown in many regions of the non-black-earth zone, including Ivanovskaja Province.—R.P.J.

5 GODUNOVA, K. N. [**Varieties of spring wheat for the irrigated land in the south-east of the USSR and the agronomic measures employed in their cultivation.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 8, 52-9. [State Comm. Var. Trials. Grain, Oil Crops and Herb. Plants]

Spring wheat is grown on 60% of the irrigated areas in the south-east USSR. Varieties suitable for cultivation in the various provinces are specified. In grass/arable rotations the best results are obtained when spring wheat follows a long-duration ley. Irrigated spring wheat should receive heavier applications of N, P, and K than unirrigated. The yield is increased by applying organo-mineral fertilizers during pre-sowing cultivation at the rate of 4 to 6 ctr./ha., and, in the rows with the seed at the time of sowing, at the rate of 1 ctr./ha. Rates of seeding vary from 150 to 220 kg. of certified seed per ha.—R.P.J.

6 LOVČIKOV, I. S. and BUDJUK, V. P. [**The best varieties of spring wheat for the irrigated areas of the south-east and central black-earth belt.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 5, 3-6.

The agronomic characteristics of several spring-wheat varieties are outlined, with special reference to their origin and adaptation (regionalization) in certain provinces of the Soviet Union. The varieties include: Albidum 43 (bred at the Institute of Agriculture for the South-East), the most satisfactory of the soft wheats, gave good yields in the Harabalinsk trials, Astrahan Province, but is not resistant to loose smut (*Ustilago tritici*); Melanopus 69 (a hard wheat, bred at the Krasnokut State Breeding Station) gives the highest yields of all the regionalized types of hard wheats and has a 1000-grain weight from 35 to 48 g.; Lutescens 758 (bred at the Institute of Agriculture for the South-East) proved satisfactory in preliminary trials in the Pugačev irrigated area, Saratov Province, where grain yields of 20-30 centners per hectare were obtained, but on soft earths of the Harabalinsk trial plots average yields were 45.6 ctr./ha; Bezenčuk 98 (bred at the Bezenčuk State Breeding Station) is resistant to loose smut and to brown rust (*Puccinia triticina*); Donskaja garnovka 672 (a hard wheat bred at the Rostov State Breeding Station) is suitable for mechanized harvesting, and has a 1000-grain weight of 32.8 g.; Narodnaja (bred at the Harjkov State Breeding Station) is adapted to several regions, including Baškir ASSR; Čakinskaja 226 (a hard wheat bred at the Čakinsk State Breeding Station, Tambov Province) is above the average in resistance to diseases and has a 1000-grain weight of 38-40 g. The new varieties described have been produced under irrigated conditions and each should give not less than 60-70 centners per hectare of high-quality grain. The types are resistant to lodging, suitable for combine harvesting, and resistant to diseases and pests. —M.H.

7 ROSSER, D. **Spica—a new wheat variety.** *Qd agric. J.* 1952, **75,** No. 1, 1-5, illus.

This new, quick-maturing variety is the result of the final cross between an unfixed hybrid (Three Seas × Kamburico) and an unnamed hybrid selection (Pusa × Flora 3202). The mature straw is hollow, slender and mid-tall in height and is of satisfactory strength for normal Queensland conditions. The ear is prominently awned, of medium size and bears large, semi-vitreous grain, the flour of which is well suited to modern baking requirements. Spica is highly resistant to stem rust and shows some resistance to leaf rust. Compared with the wheat varieties Gabo, Puora and Seafoam, Spica yielded well, both under very wet and also dry conditions. It is unsuitable for hay, on account of its awns. Its quick maturity and liability to frost damage when sown early make it unsuitable as a dual-purpose grazing plus grain variety.—K.L.

8 THOMAS, I. and REEVES, J. **New cereal varieties in Australia.** *J. Dep. Agric. W. Aust.* 1952, **1,** No. 3, 391-2.

Particulars are given of the following new wheat varieties, Festival, Panther, Dirk, Dirk 48, and Insignia 49.—K.L.

9 FAJERSSON, F. Pondusvårvetet under olika årgångar från försöken på Weibullshlolm. [**The yield of Pondus spring wheat in different years in trials at Weibullsholm.**] *Weibulls ill. Årsb.* 1952, **47,** 3-5.

The results are given of yield comparisons of Pondus with Kärn II and Brons grown at Weibullsholm over a number of years, to illustrate the yield differences between these varieties from year to year. In all cases, Pondus was superior in yield to the other 2 varieties, particularly during 1947 when conditions were exceptionally dry during summer. From these results it is concluded that where the later maturity of Pondus (2 to 3 days) compared with Kärn II does not matter, Pondus is preferable to Kärn II on good soils. Where soils are relatively less suited to spring wheat growing and earliness is of some consequence, Kärn II is preferable to Pondus. Where early maturity is a ruling consideration, Diamant II is preferable to Pondus.—P.J.B.

10 FAJERSSON, F. Kärnvårvete II — en sammanställning av aktuella försöksresultat. [**Kärn II spring wheat—a summary of current trial results.**] *Agri. hort. gen. Landskrona* 1952, **10,** No. 1-2, 75-96, bibl. 7, English summary pp. 95-6.

Kärn II is the product of the cross (Extra Kolben x Holland spring wheat) x (Marquis x Hâtive inversable) and was released in Sweden in 1949, since when it has become the most widely cultivated spring wheat in that country. This report summarizes the results of a large number of trials in Sweden with Kärn II since 1947 at a wide range of locations. Except for Pondus, Kärn II has outyielded all other spring wheats in Sweden. In good conditions, Pondus has outyielded

Kärn II by a considerable margin, but, on relatively poorer soils, the yields of these two varieties have been similar. In lodging resistance, Brons, Ella and Pondus were slightly better than Kärn II, while Progress was considerably better. On an average, over the whole of Sweden, Diamant II was about 2 days earlier in maturing than Kärn II. Kärn II had a higher 1000-grain weight than any other variety tested and was also considered to have the highest baking quality. In mildew (*Erysiphe graminis*) resistance, Kärn II was superior to Diamant II, Ella, Pondus and Rival and at least equal to other Swedish varieties. In leaf rust (*Puccinia triticina*) resistance, Kärn II appeared to be superior to Diamant II and Progress. In stem rust (*P. graminis tritici*) resistance, Kärn II appeared to be superior to Diamant II, Ella and Progress, but inferior to Brons and Pondus.—P.J.B.

11 Åkerman, Å. and MacKey, J. Svalöfs Fylgiavårvete II (0972 c). Ny sort av Fylgiatyp. (**Svalöfs Fylgia II spring wheat (0972 c). A new Fylgia-type variety.**] *Sverig. Utsädesfören. Tidskr.* 1951, **61,** 342-6, English summary pp. 345-6.

The results are given of comparisons of a new spring wheat variety, Fylgia II, with Fylgia I and Brons in trials carried out by the Swedish Seed Association and the State Institute for Agricultural Research at a number of locations in south Sweden. In a total of 39 trials during 1945-50, the mean grain yield of Fylgia I was 3190 kg. per ha., and was exceeded by Brons and Fylgia II by 1.2 and 2%, respectively. In a series of 22 trials during 1944-50, the straw yields of Fylgia I and II were 5630 and 5910 kg. per ha., hectolitre weights 80.5 and 81.0 kg., the crude protein content of both 11.8%, bread volume 576 and 610, straw strength (in a scale of 1-10) 6.9 and 8.2, and days to mature 114 and 115, respectively. Compared with Fylgia I, therefore, Fylgia II represents a considerable improvement in grain yield, straw strength and bread volume. In 6 trials comparing Fylgia II with Brons, the average crude-protein content was 11.3 and 10.8 and bread volume in cm.^{3} per 100 g. flour was 645 and 608, respectively. In comparative trials with Kärn II in south and middle Sweden, Kärn II has outyielded Fylgia II by 1.3% in 53 trials. Fylgia II is a sister strain to Fylgia I, being a selection from the cross Extra Kolben II × Aurore.—P.J.B.

12 Sim, J. T. R. and others. **Kernel characteristics of the bread-wheat varieties grown in South Africa.** *Bull. Dep. Agric. S. Afr. 253* 1951, pp. 72, illus. [Stellenbosch—Elsenburg Coll. Agric.]

In addition to a description of the distinguishing characters of the wheat kernel, brief notes, illustrations of the kernels and an index of synonyms are given of the main bread-wheat varieties grown in South Africa.—K.L.

13 Pesloa, V. A. and Honkavaara, T. Apu-kevätvehnä uusi, aikainen kevätvehnälajike. **Apu-wheat, a new Finnish early spring wheat variety.** *Valt. Maatalousk. Tiedon.* 1952, No. 228, 3-12, bibl. 23.

Apu wheat (Jo 08590) originated from the cross Garnet (Canada) × Pika (Tammisto, Finland). It is an awned variety with glabrous, smooth spikelets ; it is 10-12 days earlier than the Swedish variety Diamond, 4-6 days earlier than the Finnish (Tammisto) Tammi and Garnet wheats, but 2-3 days later than Pika and the Canadian Prelude wheats. Apu can be grown in the most northerly wheat-growing areas in Finland, as far as the Polar Circle (66°30°N. lat.) ; it gives higher yields than the above-named varieties at the experiment stations in middle and north Finland. Apu is resistant to stripe rust (*Puccinia glumarum*), brown rust (*P. triticina*) and some foot rots, but is rather susceptible to stem rust (*Puccinia graminis*) and loose smut (*Ustilago tritici*). The kernel weight and hectolitre weight are medium. Apu wheat is suitable for extending wheat growing in Finland in those areas where the climate is not very favourable for the bread cereals, wheat and rye.—From authors' abstract.

14 Brun, L. H. Forsøk med vårkveitesorter 1935-1948 og forsøk med vårkornsorter 1936-1948. [**Trials with spring wheat varieties from 1936 to 1948 and trials with spring cereal varieties from 1936 to 1948 (in Norway).**] *Forskn. Fors. Landbr.* 1951, **2,** 221-62, bibl. 10, English summary p. 261. [Stat. Forsøksgård, Voll, Trondelag, Norway]

The results are given of trials with 51 Norwegian and introduced varieties of spring wheat, carried out during 1935-48 in Møre og Romsdal and in north and south Trøndelag. The mean temperature during the period May to September was 10.5°C and rainfall 301 mm. At Voll, no spring wheat tested was completely dependable for harvest ; a dependability of 90% was established for the very early variety Snøgg II and of about 75% for the medium-early varieties Ås, Ås II, Skirne and Fram II. The 6-row barley varieties were completely dependable under the same conditions, while medium-early varieties of oats, such as Gullregn II and late 2-row barley varieties, such as Kenia and Freja, were somewhat more dependable than the medium-early spring wheats quoted. [In 158 trials, the control variety Ås gave a mean grain yield of 263 kg. per decare (0.1 hectare) and a straw yield of 497 kg. per decare. Compared with Ås, the average yields of Ås II, Skirne, Fram II and Snøgg II were 7, 6, 6 and 3 kg. per decare higher, respectively. Snøgg II reached maturity 6 to 7 days earlier on average than the other spring wheat varieties mentioned. The highest grain yields of the cereals tested were given by Gullregn II spring oats, with 66 kg. per decare higher average yields than Ås, followed by Herse 6-row barley with 45 kg., and Kenia 2-row barley, with 15 kg. per decare more than Ås. In yields of Scandinavian fodder units of grain, Herse 6-row barley was considerably superior to all other cereals, with an average of 53 f.u. per decare, followed by Kenia 2-row barley with 21 and Gullregn II oats, with 8 f.u. per decare more than Ås spring wheat. Where the straw was included with the grain, Herse yielded an average of 54 f.u. more than Ås, followed closely by Gullregn II oats, with 49 f.u. more than Ås.—P.J.B.

15 MORRIS, G. P. **Descriptions and diagrams of wheat and barley varieties.** *J. nat. Inst. agric. Bot.* 1951, **6,** No. 1, 20-8, illus.

Descriptions are given of: 4 wheat varieties, Hybrid 46, Staring, Nord Desprez and Pilot; and 1 barley variety, Freja.—C.L.S.

16 GOKHALE, V. P. **Wheat varieties that resist rust.** *Farmer, Bombay* 1952, **3,** No. 6, 38-46. [Coll. Agric., Poona]

The article is confined to stem rust. All Indian wheats were found to be susceptible to stem rust, although varieties like Khapli, Niphad-4 and N.P.52 were not as highly susceptible as Bansi, Baxi, Karnatak Red, etc. Foreign wheats resistant to rust were unsuitable for cultivation in India. By crossing a rust-resistant variety from Kenya with Niphad-4, high-yielding rust-resistant Kenphad varieties have been evolved and are being multiplied for distribution.—C.L.S.

17 CONSOLINI, A. Concorsi granari in Lombardia. Annata 1952. [**Wheat competitions in Lombardy in 1952.**] *Humus* 1952, **8,** No. 7-8, 18.

The highest wheat yield in the Plain, approx. 67 q./ha. (13% moisture), was obtained with the variety Mara, followed by 0.10 (66 q./ha.) and Grifo (65 q./ha.). Mara also gave the highest yields in the hills (65, 60 and 50 q./ha.), followed by S. Pastore (49 q./ha.) and Freccia (46 q./ha.). Grifo gave the highest yields in the mountains (55 q./ha.), followed by Mentana (52 q./ha.). [See also *Fld Crop Abstr.* 5 : 353.]—E.B.O.

18 KUDRJAŠOVA, K. E. [**Biological improvement of seed of spring wheat.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 3, 76-7. [North-Donets State Breed. Sta.]

Results are reported of experiments in which the spring wheats Lutescens 62, Albidum 43 and Melanopus 69 were sown in late autumn. The seeds obtained by once sowing of spring wheat in autumn in the North-Donets steppe when sown in spring gave a higher yield and a reduced incidence of *Ustilago tritici* than ordinary spring sown seed. Spring wheat from autumn sowing germinates in the spring 12 to 15 days earlier compared with spring sowing, and also comes into ear and ripens earlier, which is important for the filling of the grain. Before, or during, autumn sowing, phosphoric fertilizers should be applied, and supplementary manuring with nitrogenous fertilizers should be carried out early in the spring. The varieties of soft wheat Lutescens 62 and Albidum 43 are more stable with late autumn sowing than the hard wheat Melanopus 69.—R.P.J.

19 ZELSKIĬ, M. A. [**Concerning the formation and transmission of large size of seeds in wheat and rye.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 4, 8-11. [Kiev Agric. Inst.]

Experiments indicate that shortening the ear by removing part of it causes a marked increase in the size of grain in wheat and rye. It is claimed that the progeny of such enlarged seeds possess taller growth and give a larger yield than seed from non-shortened ears (the increase in yield amounts to 5.1 ctr. from 1 ha.). Large size of seeds due to good nutritive conditions in the embryonic period of development, is claimed to be hereditary. Repeated shortening of the ear in the progeny led to a further increase in the size of the seeds in wheat and rye. —R.P.J.

20 OWEN, P. C. **The relation of germination of wheat to water potential.** *J. exp. Bot.* 1952, **3,** No. 8, 188-203, bibl. 15, illus. [Rothamsted Exp. Sta., Harpenden, Herts.]

[The water potential at a given point in the soil is a measure of the work required to move unit mass of water from that point to a free water surface.] The relation of moisture potential to the germination of wheat was studied by supplying water to the seeds in the vapour phase, at controlled relative humidities. An apparatus for this purpose and a method of attaining the necessary precise control of temperature are described. The critical level of moisture potential at which germination is completely inhibited was not reached. Even when, as a result of infection, the duration of the experiments was limited to 20 days, up to 20% of the seeds germinated at a potential of —320 m. of water or a pF of 4.5. This is considerably drier than permanent wilting point, which is represented by a potential of —160 m. of water, or pF 4.2. There is a marked effect of moisture potential on the time taken to germinate, as times of emergence varied from 2 to over 20 days over a range of potentials of from zero to —320 m. of water, but it is probable that very little further germination would have occurred after 15 days had not fungal infection enabled the seeds to obtain liquid water by bridging the air-gap between seed and water source. This infection is probably responsible for the reduction in viability of the seeds at the lower potentials, as there is an indication that under conditions where germination is postponed considerably, seeds exhibit a reduced germinating capacity probably due to an increased susceptibility to infection. The failure of some individual seeds to germinate at potentials which allow other seeds to germinate is not due to failure to attain a critical moisture content. In soil, the percentage germination at low potentials is similar to that observed without soil, but the reduction in the total germinating capacity, or viability, after 20 days is not as great, and this is probably due to the reduced incidence of visible infection observed under these conditions.—Author's summary.

21 Du Plessis, S. J. and Nortjé, J. H. **Susceptibility of wheat and rye varieties and of grass species to *Ophiobolus graminis* Sacc.** *Sci. Bull. Dep. Agric. S. Afr. 328* 1952, pp. 19, bibl. 6, illus. [Stellenbosch-Elsenburg Coll. Agric.]

All the 47 wheat varieties subjected from 1946-1950 to infection with *Ophiobolus graminis* under natural and under greenhouse conditions, were extremely susceptible to take-all. No sign of increased resistance could be observed in the descendants of Sterling plants which originally survived severe take-all outbreaks. The rye varieties, Abbruzzi (40-9), Cape Rye, Stooling Rye, Balbo and Nostrana commune, appeared to possess a relatively high degree of resistance to *Ophiobolus* and a marked capacity to recuperate from its attacks. Not one of the 107 wheat x rye (Chinese wheat x Abbruzzi) hybrids which were available, proved to be any more resistant to take-all than Sterling wheat, when subjected to infection during three successive years. *Agropyron distichum* is apparently still more susceptible to take-all than wheat. All the hybrid descendants from crosses between *Agropyron elongatum* and several wheat varieties were as susceptible to take-all as Sterling wheat. All of the 15 grass species planted in take-all infected soil contracted the disease.—From authors' summary.

22 Vanderwalle, R. Le piétin du froment. [**Foot-rot disease of wheat.**] *Rev. Agric., Brux.* 1952, **5,** 367-71, English and German summaries p. 371. [Sta. Phytopath. État, Gembloux]

The 2 most frequent types of foot-rot disease affecting cereal crops in Belgium are described. In the first, caused by *Ophiobolus graminis*, there is a shrivelling of the plants. Damage is greater after mild winters. For its control the following measures are recommended : to plough in deeply all residues from harvest ; not to use farm-yard manure made from infected straw ; not to grow wheat and barley frequently in the crop rotation (in Belgium these 2 crops are more susceptible to *O. graminis* than the other cereals) ; to spray wheat crops in the 6- to 8-leaf stage, i.e. from 15 March to the beginning of April, with 10% sulphuric acid. The other foot-rot disease described, caused by *Cercosporella herpotrichoides*, causes lodging. Damage from this appears to be greater after severe winters and when the cereal plants have been injured by late hoeing. No effective control measure has yet been found. —E.B.O.

23 Sarasola, A. A. and Garese, P. Resistencia a *Helminthosporium sativum* en plantitas de trigo y cebada por tratamiento de la semilla con sulfato de cobre. [**Producing resistance to *Helminthosporium sativum* in wheat and barley seedlings by treating the seed with copper sulphate.**] *Phyton* 1951, **1,** 47-67, bibl. 31, illus., English summary p. 47. [Fac. Agron., Univ. La Plata (A.A.S.), and Inst. Bot., Minist. Agric. Argentina (P.G.)]

Resistance to *Helminthosporium sativum* was achieved by steeping the seeds in dilute $CuSO_4$ solutions. Germination was affected both in wheat and barley, but concentrations of not more than 0.25% in the case of wheat and 0.50% in that of barley, for periods of 9 to 21 hours, were found to be compatible with germination.—G.M.R.

24 Bever, W. M. **Differential lethal effect of hot-water treatment on the loose smut mycelium in nine varieties of winter wheat.** *Phytopathology* 1951, **41,** 875-9, bibl. 5. [Illinois Agric. Exp. Sta., Urbana]

The seed of 9 different winter wheat varieties infected with loose smut (*Ustilago tritici*) mycelium was pre-soaked in water for 4 hr. and then subjected to different hot-water treatments ranging from 129 to 147°F. The different varieties reacted differently in terms of germination percentages and control of loose smut in the seed. In further studies to determine the reason for this differential reaction, it was found that the seed of the different varieties absorbed varying amounts of water during the 4 hr. pre-soaking treatment. Loose smut mycelium in the variety Brill was killed at a temperature of 138°F., whilst it survived a temperature of 147°F. in Clarkan ; after a 4 hr. pre-soaking treatment, the moisture content of Brill and Clarkan seed increased by 35.8 and 17.0%, respectively. In further trials, 5 and 6 hr. pre-soaking treatments were used. A 6 hr. pre-soaking treatment, followed by hot-water treatment at 130°F. for 10 min. completely eliminated loose smut in the seed of all varieties. Hot-water additions, rather than the use of live steam, appeared to be more suitable for maintaining a constant water temperature during the hot-water treatment.—P.J.B.

25 VALLEGA, J. and others. Epifitia de la roya del tallo en los cultivos de trigo en 1950. [**Attack of black stem rust on wheat in 1950.**] *Publ. Minist. Agric. Argent., Inst. Fitotec. 127* maps 3, illus.

An attack of black stem rust (*Puccinia graminis tritici*) which occurred in the wheat-growing areas of Argentina in 1950 is described. The strains of *P. graminis* present were identified and the varietal resistance of the wheats assessed.—W.J.B.

26 ASHDOWN, D. and others. **Hazards in the use of Parathion for greenbug control.** *J. econ. Ent.* 1952, **45**, 82-4. [Okla. Agric. Exp. Sta., Stillwater]

The spraying of a total of over 2.5 million acres of wheat with emulsifiable Parathion formulations for controlling greenbug, *Toxoptera graminum*, in Oklahoma, in 1950 and 1951, involved a number of cases of severe poisoning and 2 reported fatalities in humans. Where reasonable precautions were taken, cattle and other livestock were not adversely affected in sprayed areas. A number of additional precautions are suggested to render the use of Parathion formulations safer.—E.B.O.

27 JENKINS, C. F. H. and FORTE, P. N. **Insect pests and their control. The webworm** (*Talis pedionoma Mayr.*?) *J. Dep. Agric. W. Aust.* 1952, **1** (3rd Ser.), No. 2, 187-93, bibl. 2, illus.

Recent investigations suggest that the webworm, formerly known as *Sclerobia tritialis*, is probably a Crambid moth (*Talis pedionoma*). The webworm caterpillars cause serious damage to wheat, barley and rye crops sown on recently ploughed-in grass or stubble, though oats and clovers are not subject to attack. Early-sown crops and crops planted on fallow are less liable to attack. Experiments have shown that the application to infested wheat crops of DDT dust (28 lb. per ac. of 2% DDT) or spray (from 4 oz. to 2 lb. DDT at 10 gal. per ac.) has almost eliminated the caterpillars from the sprayed area. Further investigations are required before more general recommendations for the control of the insect can be made. [From *Herb. Abstr.*]—K.L.

28 ZARUBAĬLO, T. Ja. and KISLJUK, M. M. [**Vernalization at temperatures below zero as a method of training wheats for hardiness.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow* 1951, **18,** No. 8, 19-26, bibl. in text. [All-Union Inst. Plant Industr.]

[See *Plant Breed. Abstr.* 22 : 1798.]

29 CHINOY, J. J. and NANDA, K. K. **Effect of vernalization and photoperiodic treatments on growth and development of crop plants. II. Varietal differences in stem elongation and tillering of wheat and their correlation with flowering under varying photoinductive and post-photoinductive treatments.** *Physiol. Plant.* 1951, **4,** 427-36, bibl. 13. [Bot. Dep., Delhi Univ., India]

Three Indian varieties of *Triticum vulgare*, N.P. 165, N.P. 52 and P.C. 591, were subjected to different photoinductive and post-photoinductive treatments. The period of photoinductive treatment was very short and had relatively little effect on vegetative growth of the plants compared with the post-photoinductive treatments. Long photoperiods (18 to 24 hr.) in the post-photoinductive treatment period accelerated stem elongation and stem height reached an early maximum value. Under normal day length (October to March in Delhi) and under a short day length of 6 hr., stem elongation was slower than under a long day length, but continued for a longer period. Final stem height was greater under normal day length than under long and short day length. Varietal differences in response to stem elongation to day length were not great, though elongation continued longer in the case of P.C. 591 than in the other 2 varieties. P.C. 591 is 5 to 9 days later in maturity than the other varieties. There were marked differences in tillering under different post-photoinductive photoperiodic treatments. Long day length appeared to inhibit tillering, which appeared to be due to the acceleration in flowering caused by this treatment, in spite of the relatively high photosynthetic activity of the plants. Tillering was also suppressed in plants under short-day conditions as a result of low photosynthetic activity. Under normal day length, the tillering rate was initially high, but declined subsequently owing to the drying-off of tillers. There was no significant difference between varieties in respect of tillering response. It appeared that the differential response of stem elongation to photoperiodic treatment was brought about by the acceleration or retardation of flower development. [See also *Fld Crop Abstr* 5: 608.] —P.J.B.

30 CHINOY, J. J. and NANDA, K. K. **Effect of vernalization and photoperiodic treatments on growth and development of crop plants. III. Rate of dry matter production, net assimilation rate, and water content of wheat under varying photoinductive and post-photoinductive treatments.** *Physiol. Plant.* 1951, **4,** 575-91, bibl. 6, illus. [Bot. Dep., Delhi Univ., India]

The variety N.P. 52 of *Triticum vulgare* was subjected to different photoinductive and post-photoinductive treatments. Net assimilation rates and relative growth rates were not significantly affected by the different photoinductive treatments. The effect of post-photoinductive long-day (18 to 24 hr.) and normal-day (October to March day length at

Delhi) treatments on relative growth rates and assimilation rates did not differ significantly, though short-day (6 hr.) treatments resulted in significantly lower growth rates than those following long- and normal-day treatments. Leaf growth rates were significantly higher in plants under normal-day treatments than those under long- and short-day treatments. In the case of plants under long-day treatments, the relatively low rate of leaf production was probably due to the suppression of tiller growth caused by acceleration of flower development. The net assimilation rate was significantly lower in short-day plants than in long-day plants, which explains the low rate of tillering of plants under short-day conditions. Where assimilation rates were calculated on the basis of the period of illumination, there were very small differences between plants grown under the 3 light treatments. The water content of plants declined with age under all 3 light treatments, the rate of decline being greatest in long-day and smallest in short-day plants.—P.J.B.

31 CHINOY, J. J. and NANDA, K. K. **Effect of vernalization and photoperiodic treatments on growth and development of crop plants. IV. Uptake of nitrogen, phosphorus and potassium by wheat plants under varying photoinductive and post-photoinductive treatments.** *Physiol. Plant.* 1952, **5**, 11-32, bibl. 76. [Bot. Dep., Delhi Univ., India]

Studies are reported of the N, P and K content and uptake of the Indian *Triticum vulgare* variety N.P. 52, grown under short-day (6 hr. illumination), normal-day (day length between October and March at Delhi) and long-day (18 hr. illumination) conditions. The results of studies of the ratios of the N, P and K content of the stem and leaf indicated that the distribution of these elements between the stem and leaf determined the respective magnitude of the growth of these parts. Plants grown in long-day conditions flowered earlier than those grown in normal- and short-day conditions and the transference of N, P and K from the leaf to the stem and ear, took place sooner. The tiller and root development of long-day plants ceased at an earlier growth stage than that of the short- and normal-day plants, this being due to a high auxin concentration in the long-day plants. It is suggested that the mechanism which inhibits both tillering and increase in the dry weight of plants under long-day conditions is similar to that inhibiting development in early wheat varieties, as contrasted with late varieties. This regulatory activity also controls uptake of minerals and their distribution.—P.J.B.

32 MOROZOV, P. V. [**Concerning the ripening of the grain in some spring wheat varieties.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1951, **18,** No. 6, 67-8.

The process of the accretion of dry matter in the grain (ripening of the grain) of spring wheat was studied at the Moscow State Selection Station from the aspects of duration and intensity. On the basis of duration (the period from the beginning of the formation of the grain to maximum accretion of dry matter), the varieties may be divided into three groups: early, medium-early and late ripening. The varieties also fall into three groups according to the intensity of the accretion of dry matter in the grain. The varieties belonging to the different groups are specified.—R.P.J.

33 CARPENTER, R. W. and others. **Nitrogen uptake by wheat in relation to nitrogen content of the soil.** *Agron. J.* 1952, **44,** No. 8, 420-3, bibl. 8, illus. [Mandan, N. Dakota]

An experiment to study the relationship between total soil N and the utilization of N by wheat plants was carried out on wheat plots differing in total N content. After the flowering stage had been reached the uptake of N declined in the plants on low-nitrogen soils but continued in the plants on high-nitrogen soils. There was a positive correlation between the N content of the soil and the N content of the plants at all stages. There was a much closer relationship between the N content of the plant at all stages and the yield of grain than between the N content of the soil and the yield of grain.—W.J.B.

34 NOULARD, L. Influence des hormones de groupes du M.C.P.A. et du 2,4-D sur un froment d'hiver. [**Influence of hormones of the MCPA and 2,4-D groups on winter wheat.**] *Rev. Agric., Brux.* 1951, **4,** 311-15. [Sta. Rech. État Amélior. Plantes de Grande Cult., Gembloux, Belgium]

Concentrations of one per thousand of the pure product in commercial preparations of MCPA and 2,4-D, sprayed in aqueous solution at the rate of 1000 l. per ha. at the beginning of stem elongation (of wheat plants), has no depressive action on the yield of wheat, nor does it have any marked influence on the hectolitre weight, the 1000-grain weight, or the baking quality.—D.B.

35 HANSEN, B. **Impurities in technical Methoxone and their influence on plants.** *Physiol. Plant.* 1951, **4,** 667-76, bibl. 4. [Bot. Lab., Lund, Sweden]

The results are given of studies of the effect of pure Methoxone and technical Methoxone, containing about 60% 2-methyl, 4-chlorophenoxyacetic acid and 40% of impurities made up of different phenols and phenoxyacetic acid, on the growth of wheat, peas, mustard and linseed.—P.J.B.

36 MARIMPIETRI, L. La fertilisation des céréales. [**Fertilizers for cereals.**] *Publ. Roma, Sta. Chim.-agr. Sper. 46* 1951, pp. 14, bibl. 14, English and German summaries pp. 12-14.

This is a general report to the 2nd World Congress on chemical fertilizers, held at Rome in October, 1951. World cereal production is estimated at about 5.5 milliard q. per year, which represents 55% of the total plant products. The water, soil and nutrient requirements of wheat are discussed, with particular reference to N, P and K manuring. It is thought that, if wheat crops were more abundantly manured, the area under wheat could be reduced by at least a fourth without lowering the total production. The manuring of other cereals, *viz.*, barley, oats, rye, maize and rice, is briefly considered.—E.B.O.

37 LANZA, F. Ricerche sulla fertirrigazione con soluzioni titolate. Nota 1. L'uso dell'ammoniaca in soluzioni acquose come fertilizzante azotato per il frumento. [**Investigations on fertilizer-irrigation with titrated solutions. Note 1. The use of ammonia in aqueous solutions as a nitrogen fertilizer for wheat.**] *Publ. Roma, Sta. Chim.-agr. Sper. 50* 1951, pp. 22, bibl. 16, illus.

It is thought that the use of ammonia as a nitrogen fertilizer could be developed in Italy only if the ammonia solutions were to be introduced in the irrigation water (sprinkler irrigation). A laboratory test and a field trial were carried out to compare ammonia applied in irrigation water to wheat with calcium nitrate applied in the solid form. The amount of nitrogen applied in the ammonia solutions and in the nitrate was 30 kg./ha. The main results were : (a) there were only small differences between wheat yields from the ammonia solutions and from the nitrate ; (b) there were practically no losses of ammonia by evaporation after treatment ; (c) although ammonia was applied at concentrations up to 5 per thousand, the young wheat plants suffered no damage ; (d) it appeared possible to use these high concentrations during winter because of the low value of the ratio of ammonia per cu. m. of air/ammonia per l. of water ; (e) N applied as nitrate had a quicker effect on wheat plants than when applied as ammonia ; this superiority was more evident in the early stages of growth than at maturity.—E.B.O.

38 ROBERTSON, L. S. and others. **Nitrogen top dressings for wheat on heavy soils.** *Quart. Bull. Mich. agric. Exp. Sta.* 1952, **34,** No. 3, 226-31.

Results of studies on the response of winter wheat, growing on heavy soils, to spring applications of nitrogen are reported. About 40% of the wheat fields tested yielded more when adequate amounts of N applied in the form of sulphate of ammonia were available to the crop. Results showed that the optimum rate of application for the best yields was 20 lb. of N per ac. By means of deficiency symptoms and green tissue tests it was possible to predict fairly accurately whether or not the plant was getting sufficient nutrients to satisfy its needs. By testing frequently it was possible to detect a nutrient deficiency prior to the development of visible symptoms.—From authors' summary.

OATS

39 GLIEMEROTH, G. Untersuchungen über die Einspritzung von Speiseerbsen in Hafer. [**Investigations on the sowing of cooking peas in oats.**] *Z. Acker- u. Pflbau* 1950, **91,** No. 4, 519-44, bibl. 17. [Inst. Acker- u. Pflbau. Univ. Göttingen, Germany]

Three-year experiments were made on loam soil, in which 3 oat varieties (Fläming, Beseler and Silberhafer) differing in growth habit were drilled at the rate of 115 kg. per ha., after which 3 varieties of cooking peas, also differing in growth habit, were hand-sown into the oat drills at 3 seeding rates and between the oat plants so that no two pea plants stood next to each other. In comparison with the control (pure oat cultures), a noteworthy average increase of yield was recorded for the oats grown with peas. The total yield of the mixture was clearly influenced by the variety of oat used and probably also by the variety of pea, but the difference in seeding rate of the peas, whether 10, 15, or 20 kg. per ha., did not appear to affect the total yield. The performance of the peas did not correspond to that of the same peas grown in pure cultures, for as shading by the oat plant increased, bulk growth, pod setting and grain formation in the peas were reduced. The low-growing pea was much suppressed in every case ; high-climbing varieties do best in mixtures with oats. For this reason the choice of oat variety is important and of the 3 tested, the erect, short-haulmed variety Silberhafer, which has no tendency to lodge, was found to afford peas the best growth conditions. The yield of the mixtures was more reliable than that of the pure oat cultures : mixtures also proved more remunerative. Although these findings were constant under the very different weather conditions of the 3 years 1946-8, it is noted that under different climatic and soil conditions they might not hold good ; in a similar experiment conducted on clay soil the peas were a complete failure.—G.M.R.

40 GLIEMEROTH, G. Untersuchungen zur Frage der Stickstoffabgabe von Leguminosen an beigemengte Stickstoffzehrer. [**The furnishing of nitrogen by leguminous plants to nitrogen consumers growing with them.**] *Z. Acker- u. Pflbau* 1951, **94,** No. 2, 106-32, bibl. 23, illus. [Inst. Acker-u. Pflbau. Univ. Göttingen, Germany]

In a 4-year pot trial the performance of oats in a pure culture was compared with that of oats grown in a mixture with peas. Symptoms of N deficiency (leaf discoloration, etc.) in the pure culture, due to soil poverty in N, were observed in the mixture also, so that no noteworthy advantage for the farmer is to be expected from growing a mixture rather than oats alone. Nevertheless, differences in the rate of uptake of N indicated that a certain additional supply of N had been furnished by the legumes. At first, oats grown alone absorb greater quantities of N than oats grown in a mixture; then, relatively late, when uptake by the oats alone decreases considerably, greater quantities of N are absorbed by the mixture. The beginning of this increased absorption, and with it the performance of the mixture, differs considerably in the individual years and series: when it sets in relatively early, an increase in the production of dry matter can result, but when it is much delayed the production of dry matter is less than in the oats grown alone. In other series, a higher percentage N content in the dry matter of the mixture is recorded, while bulk yield and quantity of N are lower than in the oats grown alone. Simultaneous studies of the number and nature of the pea root nodules show, in the different series, great differences in the beginning of perceptible nodule degeneration. Early beginning of this degeneration and early increased uptake of N are found to correspond, so that differences in the furnishing of additional N may perhaps be explained by the amount of nodule degeneration and the time, early or late, at which it sets in.—G.M.R.

41 Collister, E. H. and Kramer, H. H. **The effect of oat variety on the stand and development of red clover.** *Agron. J.* 1952, **44,** No. 7, 385. [Purdue Univ. West Lafayette, Ind.]

Preliminary trials were made to assess the value of different oat varieties as cover crops for *Trifolium pratense*. For each oat variety, details are given of: population of the undersown clover, yield of clover, development of individual clover plants, grain yield of oats and mean height of mature oats. [The straw yield of the oat varieties is not given.]—W.J.B.

42 Rosen, H. R. and York, J. O. **Arkwin, a new winter pasture oat for Arkansas.** *Arkans. Fm Res.* 1952, **1,** No. 2, 4.

Arkwin combines good winterhardiness with resistance to *Helminthosporium* blight. Its grain yields are high where it is not grazed. When grazed, it provides abundant forage during autumn and winter and it is here that its main value for Arkansas conditions lies. When grazed up to February and then top-dressed with N, it will give good grain yields.—P.J.B.

43 Kornilov, A. A. [**An early ripening oat, Dolinskiĭ GK-16.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 2, 31-4. [Karagandinsk Agric. Exp. Sta.]

In the Soviet Union there is need for oat varieties which differ widely in the length of their vegetative period. The above Station has been concerned with oat selection since 1936, and special attention has been given to obtaining an early-ripening type suitable for late sowing after flooding. In areas where flood waters do not drain away quickly, sowing may not be possible before June. Thus there is need for an oat which ripens quickly and has a short light-stage of development, combined with rapid development under conditions of long days and rising temperatures. A history of oat selection work carried out since 1936 is given. Comparison is made of the characteristics of the types produced, and the merits of Dolinskiĭ GK-16 for meeting the above requirements are noted. It is also considered to be a promising type under conditions of the dry steppe of Central Kazahstan. During 1951 this variety was included in productivity trials on the collective farms in the Karagandinsk Province.—M.H.

44 Litsenberger, S. C. and Bensin, B. M. **Golden Rain oats for Alaska.** *Circ. Alaska agric. Exp. Sta. 15* 1951, pp. 9.

The results are given of comparative trials with Golden Rain (a Swedish variety released for general farming in Alaska in 1951), Climax and Gopher, carried out in the Manatuska Valley and in the Fairbanks region of the Tanana Valley in Alaska. Over a 5-year period at the Manatuska Station, Golden Rain gave average yields 4 bu. per ac. lower than Climax and 4 bu. per ac. higher than Gopher. At the Fairbanks Station, over a 3-year period, Golden Rain gave average yields of 77.4 bu. per ac., compared with 73.2 for Gopher and 70.8 for Climax. Golden Rain matures at from 2 to 5 days later than Gopher and from 3 to 7 days earlier than Climax. Golden Rain and Gopher were similar in resistance to lodging and both were superior to Climax in this respect. Golden Rain has proved susceptible to covered smut (*Ustilago avenae*). Data are given of the chemical composition of Golden Rain, Climax and Gopher: these indicate that Golden Rain compares favourably with other oat varieties in Alaska.—P.J.B.

45 Hagberth, N. O. Sisuhavre. [**Sisu oats.**] *Weibulls ill. Årsb.* 1952, **47,** 16-17.

Sisu oat was bred at Hankkjas Plant Breeding Institute at Tammisto, Finland, from a cross between the white oat variety Vasa and a black oat line, Tammisto 02272. In Finland it has outyielded the widely grown variety Gullregn II by 10%. In trials during 1946-51 in south and middle Sweden, Sisu outyielded Gullregn II by 6.4% in 117 trials, and Sol II by 0.6% in 112 trials. Sisu has extremely stiff straw and in this respect was superior to all other varieties, except Bambu II. Sisu has a relatively low hectolitre weight, but has a very high kernel content. This variety is suited to conditions in south and central Sweden where, by reason of its high grain yield and stiff straw, it should provide a valuable addition to the present range of varieties grown.—P.J.B.

46 JONES, P. J. **Oat variety trials.** *Scot. Agric.* 1951, **31,** 132-4, bibl. 1.

From these trials conducted in 22 centres in Scotland it appears that the oat variety Sun II (sometimes known as Steel) is of better quality and likely to give higher yields than the popular variety Yielder. The variety Minor, though yielding less than Sun II, gave more grain than Yielder. Minor was shorter in the straw and the best standing oat of the three varieties.—K.L.

47 KELLY, A. F. **A description of the recommended varieties of oats.** *J. nat. Inst. agric. Bot.* 1951, **6,** No. 1, 5-19, illus.

The descriptions, which represent an average of 3 seasons observations, are confined to varieties included in the latest NIAB Recommended List, all of which belong to the species *Avena sativa* or *A. sativa orientalis*. The distinguishing characters used in the identification are classified into botanical, or constant, characters (which are described and illustrated) and field characters. Descriptions of 5 autumn sown and 14 spring sown oat varieties are given, information being itemized for each under the headings : origin, young plant, flowering culm, panicle, spikelets, grain and adaptability. Illustrations show a typical panicle from each variety.—C.L.S.

48 HERNES, O. Sortforsøk med havre i Hedmark og Oppland. [**Varietal trials with oats in Hedmark and Oppland.**] *Forskn. Fors. Landbr.* 1951, **2,** No. 5/6, 355-68, English summary pp. 368. [Stat. Forsøksgård, Møystad, Norway]

The results are given of trials with 18 varieties of oats carried out during 1934-50 at Møystad and at other locations in east-central Norway. Gullregn II was used as a standard. Only 2 varieties, Sol II and Ørn, gave significantly higher yields than Gullregn II, while Sol I gave yields approximately the same as Gullregn II. Sol II and Ørn matured 1 and 4 days later, respectively, than Gullregn II and both were very stiff-strawed. The Finnish variety Kytø gave the highest yields among the early varieties, particularly on good soils ; it was about 4 days earlier in maturity than Gullregn II. Among the very early varieties, Hein II gave good yields and was about 8 days earlier than Gullregn II.—P.J.B.

49 SILVA, A. R. da. Comportamento de variedades de aveia em Curitiba de 1941 a 1946. [**Behaviour of oat varieties at Curitiba from 1941 to 1946.**] *Bol. tec. Inst. agron. do Sul* 1948, No. 3, pp. 28, bibl. 6, English summary p. 25. [Received 1952] [Inst. Agron. do Sul, Pelotas, Rio Grande do Sul, Brazil]

An account is given of varietal trials of oats in the Brazilian State of Paraná, where the lack of well-adapted varieties resistant to leaf rust discourages oat growing. Nine varieties of *Avena sativa*, 2 of *A. byzantina* and 1 of *A. strigosa* were tested. The best results were obtained from the Saia variety of *A. strigosa*, which, under field conditions, proved immune to leaf rust and gave regular yields. Some disadvantages of this variety are enumerated. Several varieties of *A. byzantina* and *A. sativa* exhibited good characters which might be combined by hybridization.—G.M.R

50 IVANOFF, S. S. **The use of activated oat seeds in the study of winter-hardiness.** *Bot. Gaz.* 1951, **113,** 90-4, bibl. 13. [Mississippi Agric. Exp. Sta. State College]

This report deals with (a) the differential response to freezing of activated seeds [activation of enzyme systems by soaking in running water at specified temperatures] of varieties varying in winter-hardiness, (b) the effect of length and temperature of soaking on survival after freezing, and (c) the possibilities of selection for cold-resistance from large seed populations.—Extract.

51 ZUBATOVA, L. [**Control of weeds by means of chemicals.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 8, 75. [Smolensk State Sel. Sta.]

In a weed control experiment at the Station in 1951 *élite* oat plots of the Moskovskiĭ A-315 variety were sprayed on 23 June with 2,4-D at the rate of 1.3 kg./ha. and with 4K-2M at the rate of 1.5 kg./ha., the amounts of the respective preparations being dissolved in 300 l. of water. The average number of weeds on the experimental plots was approximately 300 per sq. m., the predominant species being *Raphanus raphanistrum* and *Galeopsis* sp. At the end of two weeks only 7% of the weed plants were alive. The two preparations were particularly effective against *Raphanus raphanistrum*. A few days before harvesting the oat crop, the average weight in g. of green material of weeds from 1 sq. m. was determined, and the results were as follows : untreated control plot 60, 2,4-D sprayed plot 22.0, 4K-2M sprayed plot 10.5. The figures for oat yields (ctr./ha.) for the respective plots were 18.25, 22.18, 24.30.—R.P.J.

52 PRIMOST, Edith. Zur Anwendung des Konzentratsprühverfahrens mit Dicopur (2,4-D) bei Hafer. [**Application of the concentrated**

spraying technique with Dicopur (2,4-D) in oat fields.] *PflSchBer.* 1952, **8,** 44-9, bibl. 2, English summary. [Österreich. Stickstoffwerke A.G., Linz/Donau, Austria]

The supply of water can be a serious problem in the spraying of crops with herbicides. It is then advantageous to apply the requisite quantity of active principle in the weed killer at as high a concentration as is safe to the crop. In these experiments the minimum amount of water which could be used to spray 1 kg. Dicopur without harm to the crop was 150 l./ha. When 1 kg. Dicopur was sprayed with less than 150 l. of water per hectare the yield of oats was reduced.—D.B.

53 Scotland Department of Agriculture. Adv. Leafl. No. 21 (N.S.). **Diseases of the oat crop.** 1952, pp. 9, illus.

This leaflet describes the principal diseases of the oat crop, particularly those which are seed-borne. As most of these diseases can be controlled effectively by seed disinfection, all seed oats should be so treated each year. A key for field identification of oat diseases is included.—K.L.

54 Sorteberg, A. Karforsøk med ulike mengder kalk, fosfor, kvelstoff og kalium til havre og bygg. [**Pot experiments with different applications of lime, phosphorus, nitrogen and potassium to oats and barley.**] *Meld. Norg. Landbr. Høisk.* 1951, **31,** 377-416, bibl. 12, English summary pp. 412-15.

The results are given of determinations of the effect of different N, P, K and Ca treatments, alone and in combination, on the yield, time of heading, length of growing period and other agronomic characters of barley and oats grown in pot experiments using 3 different agricultural clay soils from Norway.—P.J.B.

RYE

55 Nicholson, G. **Cultivation of rye.** *Agric. Gaz. N.S.W.* 1952, **63,** No. 7, 339-40 and 352.

Rye is a valuable crop for controlling soil erosion on poor, dry, salty soils in New South Wales. In these areas it produces early winter green-feed for cattle. An account is given of the preparation of the land, the time of sowing and the harvesting of rye. The principal varieties of rye grown in New South Wales are Black Winter, Emerald, South Australian and Balbo.—K.L.

56 Sazanov, V. I. [**An attempt to produce a variety of winter rye for Kuĭbyšev Province.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* (*Proc. Lenin Acad. agric. Sci.*) 1952, **17,** No. 5, 3-8. [Kuĭbyšev Agric. Inst.]

A new hybrid variety, Kuĭbyševskiĭ SHI, obtained by crossing the local variety of winter rye with the variety Petkus 194 from the Kharkov Station, is winter-hardy and drought-resistant. It has large, yellowish-green grain and short, tough straw. The ear is of average length and its density is above average. In trials in 1950-1, on the state varietal plots, Kuĭbyševskiĭ SHI surpassed the regionalized variety Saratovskaja No. 1 in grain yields.—R.P.J.

57 Klečka, A. Zitný klas s obilkami ovsahy. [**An ear of rye with caryopses like those of wild oat** (***Avena fatua***).] [Czech] *Sborník Čsl. Akad. Zemed.* (*Ann. Acad. Csl. Agric.*) 1952, **25,** No. 3, 153-62, Russian summary.

58 Strzemska, J. [Zagadnienie mikoryzy u zbóz. Cz. 2. Zyto. **The mycorrhiza of corn plants. Pt. 2. Rye.** *Acta Microbiol. polon.* 1952, **1,** No. 1, 24-35, bibl. 4, Russian and English summaries p. 32.

The author investigated the occurrence and nature of mycorrhiza in rye grown under different soil conditions. The influence of the stage of plant development has also been studied. About 500 preparations of root samples have been examined and the main conclusions are as follows : 1. Rye plants have a typical endotrophic mycorrhiza, the occurrence of which is general. 2. The intensity of development of the mycorrhiza increases with the age of plants, and mature plants are more infected than young ones. 3. Those roots of rye that are not infected have an irregular shape, and the root cells are deformed.—Author's summary.

BARLEY

59 Kramer, C. and others. Brouwgerst en klimaat. [**Malting barley and climate.**] *Meded. Nat Com. Brouwgerst 18* 1952, pp. 149, bibl. 38, illus.

The results are given of detailed studies of the ecological factors affecting spring barley in the Netherlands. The main part of these studies is devoted to the effect of climate and an attempt is made to evaluate the significance of this factor in explaining the differences between the vegetative growth, grain yield and malting quality of barley grown in Groningen and Zeeland, situated in the north and south of the Netherlands, respectively. From statistical studies in both regions, the following conditions appeared to be necessary for high grain yields : in both Groningen and Zeeland, dry conditions in April and early May and cool conditions in May, in Groningen, cool conditions at the time of flowering, in Zeeland, warm conditions during grain ripening, and, in both regions, moderate rainfall during the previous winter. For high malting quality, dry and sunny weather in July was necessary. Barley grown in Zeeland can be sown about 10 days earlier than in Groningen and average yields and malting quality are better in Zeeland. In respect of cultural practices, the usual growing of sugar-beet before spring barley in Zeeland is more favourable to the crop than the cereals generally grown before barley in Groningen. Also, N applications are heavier in Groningen than in Zeeland, which tends to lower malting quality. Higher air temperatures in Zeeland in March and April promote earlier germination than in Groningen. This factor tends to result in relatively cool temperatures during flowering and grain development in Zeeland ; also, conditions are relatively dry and sunny in Zeeland at the time of grain ripening. In comparative ecological investigations in both regions, the ecological time lag varied from 13 days at the time of maximum vegetative development, to 7 days at the time of ripening, between Zeeland and Groningen. The area of curve of the total length of green leaves (highly correlated with the total assimilating area of the plants) x time (the total assimilation potential) was higher in Zeeland than in Groningen. This value was closely correlated with yield. The form of the curve of average maximum leaf-length against time depended on the sowing date and from this it was shown that early sowing favoured high yields, and also, from the literature on the subject, high malting quality. The incidence of rust and mildew in barley was higher in Groningen than in Zeeland, mainly because of adjacent crops of winter barley and the effect of relatively moister conditions during grain development and ripening.—P.J.B.

60 SEED WORLD. **Kenbar winter barley.** *Seed World* 1952, **71,** No. 5, 8 and 47, illus.

Kenbar is a newly-released, 6-row, bearded barley which offers considerable promise as a high-yielding, stiff-strawed variety suitable for Kentucky and Pennsylvania. It is early maturing and outstandingly resistant to loose smut (*Ustilago nuda*). —P.J.B.

61 POEHLMAN, J. M. **B-400, a new, early variety of winter barley for Missouri.** *Bull. Missouri agric. Exp. Sta. 569* 1952, pp. 12, illus.

Mo. B-400 is an early-maturing, winter barley, adapted to central and southern Missouri, where it is fully winter-hardy. It has a high grain yield, is stiff strawed and resistant to smut (*Ustilago nuda*), mildew and spot blotch (*Helminthosporium sativum*). —P.J.B.

62 HÖRBERG, Y. Weibulls Stallar II. Ny foderkornsort för speciella områden. [**Weibulls Stallar II. A new feed barley variety for particular areas.**] *Weibulls ill. Årsb.* 1952, **47,** 14-15.

Weibulls Stallar II (W:s 5006) originated from a Kenia × Isaria cross and is thus closely related to Herta and Rika. It is particularly fitted for mixed sowing with oats, since it is very stiff-strawed, has a high straw and grain yield, little tendency to shatter at maturity and is somewhat later maturing than Stallar, a considerable advantage when used for mixed sowing with oats. In trials at Weibullsholm, in local trials and in State trials during 1946-51, Stallar II has outyielded Stallar by 4% in grain yields. In similar trials during 1944-51, Stallar II gave yields 0.5% lower than those of Kenia.—P.J.B.

63 ELLE, T. Sortforsøk med sekssradsbygg på opplandene. [**Varietal trials with 6-rowed barley in the uplands.**] *Forskn. Fors. Landbr.* 1951, **2**, No. 5/6, 323-53, bibl. 8, English summary pp. 352-3. [Stat. Forsøksgård, Møystad, Norway]

The results are given of trials with the 6-row barley varieties Varde, Herse, Jotun, Asplund, Maskin, Jadar II and Opal B in Gudbrandsdal in east Norway. Two series of trials were carried out, the first comprising 28 trials over a 10-year period on plots at 160-190 m.a.s.l. and the second comprising 31 trials over a 5-year period on plots at 300-400 m.a.s.l. Maskin was used as the standard variety. Varde gave the highest average yields of all varieties in both series, outyielding Maskin by 50 kg. per decare in the first series, and by 30 kg. per decare in the second. In very favourable soil conditions, Herse gave yields as high as Varde and Asplund gave yields only slightly lower. Asplund had a considerable tendency to lodge. Jotun gave somewhat higher yields than Maskin, but was considerably behind Varde and Herse in this respect in both trial series ; the quality of Jotun grain was poor, but it was the earliest of all the varieties. Opal B, a 2-row barley, was too late-maturing and unreliable for use in the trial region. Jadar II was only included in a limited number of trials, but gave yields comparable to Varde. It was somewhat late maturing and thus only suitable for relatively good growing conditions.—P.J.B.

64 POEHLMAN, J. M. **Breeding winter barley for hardiness and disease resistance.** *Econ. Bot.* 1952, **6,** 176-84, bibl. 7, illus. [Fld Crops Dep., Missouri Univ., Columbia]

An account is given of progress made in breeding winter-hardy, disease-resistant barleys for conditions in Missouri, where the present range of winter barley varieties does not include more than a very few that are sufficiently winter-hardy to give reliable yields.—P.J.B.

65 MACLEOD, Anna M. **Enzyme activity in relation to barley viability.** *Trans. bot. Soc. Edinb.* 1952, **36,** Pt. 1, 18-33, bibl. 35. [Heriot-Watt Coll., Edinb.]

While the reduction of tetrazolium chloride, with the formation of a red formazan in the embryo, gives a reasonably good estimate of viability in dormant and ageing cereal seed, in the case of barley which has been damaged by overheating or maize which has been injured by frost, the results of the tetrazolium chloride test in the laboratory for seed viability indicate that germination capacity is higher than that actually obtained. The close parallel, however, between loss of ability to reduce tetrazolium chloride and loss of germinative capacity has prompted this account of the mechanism of reduction of tetrazolium chloride and enzyme activity in damaged grain. The author puts forward suggestions in explanation of the facts, but maintains that the nature of biochemical changes which accompany senescence in seeds is an unsolved problem.—M.H.

66 MANN, H. H. and BARNES, T. W. **The competition between barley and certain weeds under controlled conditions. 5. Competition with clover considered as a weed.** *Ann. appl. Biol.* 1952, **39**, 111-19, bibl. 7. [Woburn Exp. Sta., Husborne Crawley, Bletchley]

One of the commonest agricultural practices in Britain is the undersowing of barley and other corn crops with clover as a preparation for a clover ley after the corn crop has been reaped. The effect of the clover growing among the corn, where manuring (especially with nitrogen) is made as favourable as possible for the corn crop, is not clear. If nitrogen is deficient, it is well known that clover can furnish nitrogen for the corn, but where the supply is ample, the clover may act as a competitive crop. When barley and clover were planted together, with abundance of water and nutrients for both, it was found that the presence of even a small number of barley plants reduced the growth of the clover by over 50%, but that an increase in the density of the barley did not increase the effect. The presence of the clover reduced the barley crop by an amount which tended to get less as the density of the barley was increased. In a sparse crop of barley, increase in clover density reduced the growth of barley very little, while that of the clover was again found to be little more than half what was obtained when this plant was grown alone. There is no evidence of any specific effect of the roots of the one plant on the other. In the circumstances of these experiments it would seem that, far from the clover supplying nitrogen to the barley, it tends to steal some of that which would otherwise be available to the latter, when they are grown together. [From *Herb. Abstr.*]—Authors' abstract.

67 TYNER, L. E. and RUSSELL, R. C. **Control of loose smut in barley by tetrachloro-parabenzoquinone (Spergon-SL).** *Plant Dis. Reptr* 1952, **36**, No. 5, 108-11. [Bot. and Plant Path. Div., Sci. Serv., Dep. Agric., Ottawa, Canada]

In trials with a number of varieties of barley, presoaking the seed in water at a temperature of 70 to 75°F. for 6, 8, or 10 hr. followed by soaking the seed in a 0.2% Spergon-SL water suspension for 40 to 48 hr. immediately prior to sowing gave, in almost all cases, complete control of loose smut.—P.J.B.

68 HALVERSON, A. W. and others. **The protein composition of Feebar, Odessa and Plains barley grown in South Dakota.** *Cereal Chem.* 1952, **29**, No. 1, 18-29, bibl. 7. [S. Dak. Agric. Exp. Sta., Brookings]

69 BORTHWICK, H. A. and others. **Action spectrum for inhibition of stem growth in dark-grown seedlings of albino and non-albino barley (*Hordeum vulgare*).** *Bot. Gaz.* 1951, **113**, 95-105, bibl. 10, illus. [Bur. Plant Industr., U.S. Dep. Agric., Md]

70 HARRIS, R. H. and BANASIK, O. J. **Effect of environment, variety and season on barley quality.** *Cereal Chem.* 1952, **29**, 148-55, bibl. 16. [N. Dak. Agric. Exp. Sta., Fargo]

The results are given of studies during 1948-50 of the quality of Montcalm, Moore, Kindred, Manchuria and Tregal barley, grown at 7 different stations in North Dakota (in one case under irrigation). Diastatic power, extract, hull content and N content were significantly different between varieties, years and stations; location had a somewhat greater influence on these factors than did varietal differences, except in the case of the rate of hull removal, which appeared to be mainly a varietal characteristic. Irrigation markedly lowered N content and diastatic power and increased extract, compared with unirrigated barley. Highly significant correlations were found between total N content, extract, diastatic power and extract N, and the corresponding qualities of malts made from 46 samples of these barley varieties.—From authors' summary.

71 ROBERTSON, L. S. and FREY, K. J. **The effect of fertilizer analyses on yields of varieties of malting barley.** *Quart. Bull. Mich. agric. Exp. Sta.* 1952, **34**, No. 3, 232-7, bibl. 15.

Investigations were made to determine whether the malting barley varieties commonly grown in Michigan and other mid-west states respond alike (in grain yield) to different fertilizer treatments. The trials showed that for the spring barley varieties, Bay, Wisconsin No. 38, and Montcalm, a liberal amount of complete fertilizer should be applied at sowing. The application of a complete fertilizer tended to accelerate the maturity of barley. There was no advantage in using 4-16-16 in place of 4-16-8 fertilizer. The reduced test weight occasionally resulting in barley after the application of nitrogenous fertilizer is probably not serious enough to keep the grain from qualifying as a malting barley. —From authors' summary.

MAIZE

72 ALABOUVETTE, F. Situation et tendances de la culture du maïs grain en France. [**The situation and trends regarding the cultivation of maize for grain in France.**] *Schweiz. landw. Mh.* 1952, **30,** 30-3. [École Nat. Agric., Montpellier]

The principal maize cultivation area of France is in the warm, humid South-west (Departments of Landes, Basses Pyrénées and Hautes Pyrénées). Another, but less favourable, region is the valley of the Garonne. The introduction of the American hybrid, Wisconsin 240, has interested farmers further north (valleys of the Loire and Beauce and the Paris Basin) in the cultivation of maize, which replaces oats or beet and, with the introduction of American methods of cultivation, yields higher than those in the South-west have been obtained. There are still many problems to be solved ; among them the place of maize in rotations and the economic returns from it ; equipment for drying and conservation has yet to be set up. An extension of the maize area cannot be expected in the traditional maize areas because the change in method of cultivation would be too costly an undertaking for the small farms of the South-west. However, yields are much lower than they should be and, with a view to improving these, investigations have been conducted on date of sowing, soil cultivation and the *rôle* of fertilizers. The work of selection and breeding of maize dates back to 1932. In 1947 the breeding plan was changed with the introduction of American hybrids.—D.B.

73 ROUSSEAU, M. Quelques résultats et considérations à propos de la culture du maïs grain en Belgique. [**Some results and considerations regarding cultivation of maize for grain in Belgium.**] *Rev. Agric., Brux.* 1951, **4,** 442-50, illus., English and German summaries pp. 449-50. [Sta. Rech. État Amélior. des Plantes, Melle, Belgium]

FAO has encouraged trials with American hybrids for comparison with local races. The general conclusions reached are as follows. In each of 2 trials an American hybrid gave the highest yields (United 28 and Wisconsin 275). Of Netherlands hybrids, Goudster and C.I.V. 1 not only produced good yields but they matured earlier than those American hybrids which gave equivalent yields. Because of their morphological uniformity the hybrids lend themselves to mechanization for all operations from planting to harvesting. The advantages of maize cultivation rest not only in the high yields compared with those from the rye crop, but also in the fact that maize provides a better crop for a rotation in sandy soils and it allows for a more satisfactory distribution of labour on a farm.—D.B.

74 VERWAEST, J. La culture du maïs grain et du maïs fourrager. [**Cultivation of maize for grain and for fodder.**] *Rev. Agric., Brux.* 1951, **4,** 1196-202, English and German summaries p. 1202.

The paper gives a brief account of the importance of this crop in Belgium, the type of soil required, the place of maize in a crop rotation, the preparation and manuring of the soil, choice of variety, sowing, prevention of attack by birds, cultivation measures, diseases and pests, harvesting, conservation and threshing. [From *Herb. Abstr.*]—D.B.

75 BECKER, W. R. Aspekte und Probleme des Maisbaus in den Niederlanden. [**Aspects and problems of maize cultivation in the Netherlands.**] *Schweiz. landw. Mh.* 1952, **30,** 25-9, illus. [Cent. Inst. voor Landbouwk Onderz.]

Climatically, the Netherlands are on the fringe of the maize cultivation area, therefore, maize is grown there for green fodder and silage rather than for grain. Being predominantly a grassland country, there has been but little interest in fodder maize except on isolated farms in the south-west of the Netherlands, where small areas of the crop are grown for horse feed. Maize cultivation was attempted during periods of economic stress, many difficulties being encountered, but the recent introduction of hybrid maize, which gave increased yields with lower labour costs, made maize cultivation worth while. In 1950 to 1951, American pure lines, suited to the Netherlands, were crossed with early-ripening local strains of German origin. These crosses were successful and one of them, Goudster, ripened earlier and yielded better than any of the American hybrids. This was largely due to its rapid early development. Germination and early development have been further improved by the use of high-quality seed and by seed disinfection. The result of this work has been a sudden increase in the area under maize cultivation in 1951 from about 5000 to 11,000 ha. There are 50 maize-harvesting machines in the Netherlands ; they are used where labour is scarce, otherwise harvesting is done by hand. The crop is dried on frames or artificially. [From *Herb. Abstr.*]—D.B.

76 Popow, G. Der Maisanbau in der Schweiz. [**Maize production in Switzerland.**] *Schweiz. landw. Mh.* 1952, **30,** 6-11. [Eidg. landw. Versuchsanstalt, Zürich-Oerlikon]

Maize cultivation in Switzerland is limited to three small regions: the valleys south of the alps, the Rhone Valley and, in east Switzerland, the Rhine Valley and the Linth plain. Since the climates of these three regions are so diverse, different varieties of maize are grown in each. The breeding of early-ripening varieties, for example, Prerauer and Kärntner, and the introduction of drying equipment have resulted in a northward extension of the area under maize. A larger area of maize is grown for silage and green fodder than for grain. The varieties grown for fodder are Nostrano dell 'Isola and Rhine Valley maize. Imported seed is also sown for fodder. Fodder maize is usually grown after early potatoes, rape or winter wheat. Seed of American hybrid maize has been introduced and placed under trial with the unexpected result that, when grown for silage in normal weather, the yield is no higher than from the old varieties of the same ripening date. On the other hand the hybrids were superior in standing capacity and resistance to drought. [From *Herb. Abstr.*]—D.B.

77 Montanari, V. La coltivazione del granturco nelle Venezie. [**Maize growing in the Venetian regions.**] *Agricoltura d. Venezie* 1951, **5,** 187-200.

Details are given of maize cultivation in the Venetian regions, including varieties and hybrids grown.—E.B.O.

78 Rosbaco, U. F. Consideraciones sobre maíces "amargos," con especial referencia a su cultivo en la provincia de Entre Ríos. [**Observations on the "bitter" forms of maize, with special reference to their cultivation in the province of Entre Ríos.**] *Idia* 1951, **4,** No. 46, 1-13, bibl. 31, illus. [Est. Exp. Tezanos Pinto, Entre Ríos, Argent.]

The literature on the so-called bitter maize is eviewed. [See also *Bull. Commonw. Bur. Past. Fld Crops 36* 1948, pp. 203-4.] While its origin s unknown and the reason why its leaves are epellent to locusts and grasshoppers is still obscure, he fact remains that in its genuine form it is highly esistant to locust attack, and the author gives nteresting supplemental information on its properies. Illustrations of cobs show them to resemble hose obtained when *Zea mays* is crossed with *Tripsacum* or with *Euchlaena mexicana*. The seedings and flowers are susceptible to attack and re readily devoured by locusts, but, from a height f 40 cm. until the plant yellows, bitter maize s practically immune. (Planting practice should ake this into account, and advice is given on the dates between which the crop should be grown so as to elude the normal times of locust invasion.) In the province of Entre Ríos, which is very liable to locust attack, bitter maize is widely cultivated but a collection of this material has proved it to be very much contaminated. The character bitter, which is recessive, should be retained if at all possible.—G.M.R.

79 Kozubenko, V. E. [**Hybrid maize Bukovinskiĭ 1.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1951, **18,** No. 6, 65-6. [Černovic Sci. Res. Sta. Crop Husb.]

Hybrid Bukovinskiĭ 1 derives from a cross between Voronežskaja 76 and Zubovidnaja 3135. In a comparative trial with the varieties Bessarabka, Borjba, Voronežskaja 76 and North Dakota it showed a superiority in yield of from 8 to 13 centners (centner = 100 kg.) per ha. In 1949, on the Gorodenkov varietal trial grounds, Stanislav Province, it yielded considerably more (up to 22 centners per ha.) than the standard varieties.—R.P.J.

80 Rossman, E. C. and others. **Michigan 350 and Michigan 250—two new corn hybrids for Michigan.** *Quart. Bull. Mich. agric. Exp. Sta.* 1952, **34,** No. 3, 201-9.

These two new, early-maturing maize hybrids were available to farmers for sowing in the 1952 season. Ears of both varieties are of medium size, with deep-yellow grain. The small cob and its open husk facilitate drying in the field. Both varieties have the ability to germinate and grow under cold, wet soil conditions. Michigan 350 and 250 are in the 90 and 85 days maturity groups respectively. In comparison with other Michigan certified hybrids, Michigan 350 and Michigan 250 excelled the other hybrids in several characteristics, such as yielding ability, shelling percentage and resistance to stalk- and root-lodging.—K.L.

81 Nyasaland Agricultural Quarterly Journal. **Maize variety trials.** *Nyasald agric. Quart. J.* 1951, **10,** No. 3, 78-80.

The trials were undertaken to compare the yields of imported open-pollinated maize varieties with local varieties and Southern Rhodesian hybrids. Results showed that Southern Rhodesian Hybrids I, II and III, with few exceptions, gave higher yields under differing soil and climatic conditions than the other varieties. The local variety Namalenga was consistently hardy and productive. The imported varieties Sahara, Hickory King, Southern Cross and Potchefstroom Pearl gave consistently good returns.—K.L.

82 Meloni, U. Il comportamento dei mais ibridi in provincia di Padova. [**The behaviour of hybrid maize in Padova Province (Italy).**] *Agricoltura d. Venezie* 1952, **6,** 69-74, illus.

While rainfall was very low and temperature high during the spring-summer of 1950, these conditions were reversed in 1951. The average data from 9 experimental fields showed that in both years most of the maize hybrids tested yielded more than the 2 local non-hybrid varieties Bianco Perla and Marano Vicentino. In particular, in 1951, the hybrids Insubria 1, US 13, Insubria 156, Maygold 99, Insubria 2, Maygold 49, King's Krost, Ohio C.92 and Iowa 4316 yielded more than the 2 local varieties, while Funk's G.19 yielded more than Marano Vicentino but less than Bianco Perla.—E.B.O.

83 ISELY, D. **The cold test for corn [maize].** *Proc. Internat. Seed Test. Ass. Rep. 9th Congr., Copenhagen, 1951* 1951, 298-311, bibl. 24. [Iowa State Coll., Ames]

A review is given of the value of cold test procedures used for testing maize seed in the USA, together with an outline of different methods used. Such cold test methods provide a means of evaluating the germination of seed under conditions which tend to delay germination and should be applicable to a wide range of crops.—P.J.B.

84 ULLSTRUP, A. J. **Leaf blights of corn [maize].** *Bull. Purdue Univ. agric. Exp. Sta. 372* 1952, pp. 22, bibl. 10.

Notes are given on the symptoms and control of northern corn leaf blight (*Helminthosporium turcicum*), southern corn leaf blight (*H. maydis*), Helminthosporium leaf spot (*H. carbonum*), Stewart's wilt (*Bacterium stewartii*) and bacterial leaf blight (*Pseudomonas alboprecipitans*).—P.J.B.

85 TAYLOR, F. **The maize stalk borer.** *Fmg in S. Afr.* 1952, **27,** No. 315, 306. [Div. Ent., Bethlehem]

86 LUCKMANN, W. H. and DECKER, G. C. **A corn [maize] plant maturity index for use in European corn borer ecological and control investigations.** *J. econ. Ent.* 1952, **45,** 226-32, bibl. 7, illus. [Econ. Ent. Sect., Ill. State Nat. Hist. Surv., Urbana]

A technique is described for indexing the maturing of a maize plant during the developmental period after tassel initiation. This technique involves comparing the relationship between height of the tassel and height of the plant and expresses maturity of the plant as the tassel bud-height/plant-height ratio. The tassel-ratio technique is illustrated by the formula :

$$100\ \frac{TH}{PH} = Tr$$

where TH represents the distance from base of plant to tip of tassel bud, PH the distance from base of plant to tip of longest leaf extended, and Tr is the tassel-ratio index. While this method of indexing plant maturity can be used from tassel initiation to harvest or death of the plant, it is more practically adapted for use during the developmental period between tassel initiation and anthesis. The advantages of the tassel-ratio index over other criteria used are illustrated. Through the use of the tassel-ratio technique it has been established that : (a) European corn-borer survival of significance begins at a tassel-ratio of approximately 15 to 20 ; (b) survival is highest on maize that will begin to show tassels in 1 to 3 days ; (c) sweet corn plants are in the critical borer-survival period during the 9 to 12 days preceding tasseling ; and (d) the most effective single application of DDT spray was applied when the maize plant had a tassel-ratio of 46 to 49.—From authors' summary.

87 GINSBURG, J. M. and others. **Recovery of organic insecticides from sprayed and dusted crops.** *J. econ. Ent.* 1952, **45,** No. 3, 428-31, bibl. 3. [New Jersey Agric. Exp. Sta., New Brunswick]

A study was made in 1951 on the rate of decomposition of residues from the insecticide 4049 (S-(1,2-dicarbethoxyethyl) 0,0-dimethyl dithiophosphate) applied as a dust on maize to control the corn borer, *Pyrausta nubilalis*. Results showed that : (a) no residues were recovered about 21 days after the last application from maize dusted 4 times with either 2 or 4% 4049 ; (b) 4049 underwent rapid decomposition on plants, leaving practically no residue 3 days after application ; and (c) 4049 gave some control of the corn borer.—E.B.O.

88 EDEN, W. G. **Control of corn earworm in sweet corn in Alabama.** *J. econ. Ent.* 1952, **45,** No. 1, 105-8, bibl. 2. [Ala. Polytech. Inst., Auburn]

Experiments on control of corn earworm, *Heliothis armigera*, were conducted in Alabama during 1950 and 1951. DDT-mineral oil emulsions gave excellent control of corn earworm in sweet corn, whether applied by knapsack sprayer or by power-driven machinery. Three applications of 10 or 20 lb. of mineral oil with 2 lb. of DDT per acre per application with a knapsack sprayer gave good control of the earworm. However, application with a knapsack sprayer reduced the total yield and caused some foliage burns. The treatments had no effect on the weight of the ears or on how well they were filled out at the tips. The same treatments, applied at 100 lb. pressure with a high clearance power-driven sprayer, caused no foliage burn or yield reduction. There were no significant differences between the controls resulting from the use of 12.5, 25 or 50 gal. of spray per acre, as long as the rate of toxicants per acre remained constant. There was no difference in the controls obtained with fan and cone nozzles or with 2 and 4 fan-type nozzles per row. When only one harvest of sweet corn was made, as is the custom with commercial growers in Alabama, 4 applications of spray were necessary to give practical control. In the test on amount of DDT in DDT-mineral oil emulsions, 2 lb. of DDT per acre per application was necessary to give 90% control. 2 lb. of DDT per acre per application in an emulsion spray gave as good control with no mineral oil as it did when applied with 5 or 20 lb. of mineral oil.—From author's summary.

89 EDEN, W. G. **Effect of husk cover of corn on rice weevil damage in Alabama.** *J. econ. Ent.* 1952, **45**, No. 3, 543-4, bibl. 12. [Ala. Polytech. Inst., Agric. Exp. Sta., Auburn]

An investigation into the relationship of husk cover of maize to rice weevil damage was conducted in 1949-50. The acid fuchsin stain method was used for measuring weevil damage. The amount of the ear exposed was used as the main criterion for rating coverage. Husk cover ratings were made on 29 varieties and hybrids of maize which were grown in 2-row plots, 50 ft. long. The weevil damage was determined at harvest and after 8 months of storage. Results showed a highly significant negative relationship between husk cover and weevil damage at harvest. After 8 months of storage without treatment, the same relationship was present, although not so marked as at harvest. —E.B.O.

90 JEWETT, H. H. and PRICE, W. A. **Protecting stored corn [maize] from grain insects by bags impregnated with DDT.** *Bull. Ky agric. Exp. Sta. 571* 1951, pp. 8, bibl. 2, illus.

Closely woven cotton bags dipped into, or sprayed with, 10% DDT solution in carbon tetrachloride gave protection for 18 months to maize within the bags.—P.J.B

1 HANSEN, J. R. and BUCHHOLTZ, K. P. **Corn [maize] seedling response to 2,4-D as affected by certain nutrient salts and metabolites.** *Proc. 8th N. Cent. Weed Control Conf., 1951* 1951, 63-6, bibl. 4. [Ky Agric. Exp. Sta., Lexington]

Seed of Wisconsin Hybrid 595 maize were germinated and the seedlings grown for 7 days in the presence of different concentrations of 2,4-D Na salt and a number of nutrient salts and metabolites, including ammonium sulphate, glycerophosphate, adenine sulphate and riboflavin. Only these named materials mitigated the effect of 2,4-D toxicity in varying degrees. Riboflavin neutralized 2,4-D in plants placed in sunlight, ammonium sulphate counteracted the effect of 2,4-D on root growth only, while adenine sulphate and glycerophosphate neutralized the toxicity of 2,4-D to both roots and shoots. 2,4-D also had the effect of neutralizing the toxic effect of adenine sulphate on seedlings, demonstrating a mutual antagonism between these two substances.—P.J.B.

92 HOSHAW, R. W. and GUARD, A. T. **Morphological and anatomical effects of 2,4-D on young corn plants.** *Bot. Gaz.* 1951, **113**, 65-74, bibl. 25, illus. [Univ. Arizona, Tucson (R.W.H.), and Purdue Univ., W. Lafayette, Ind. (A.T.G.)]

In this investigation the first internode, coleoptile, and lower young internodes of young maize plants were studied morphologically and anatomically in relation to 2,4-D treatment. All plants were grown in the greenhouse during the winter and early spring and were subjected to either pre-emergence or post-emergence treatments at concentrations of 3000 or 5000 ppm of 2,4-D. The anatomical study was made from material collected and preserved periodically up to a total of 21 days. The plants which had undergone pre-emergence treatment had bent, twisted and elongated coleoptiles ; leaves broke through the sides of the coleoptile and roots showed proliferation and fasciation. After 6 weeks, 50% of the plants remained alive ; these recovered from treatment and became erect but stunted. Plants which received post-emergence treatment had coleoptiles which became bent to the horizontal position 12 days after treatment. They recovered to the upright position 5 weeks after treatment, but the plants were stunted. The roots suffered proliferation. Anatomical examination revealed that response to 2,4-D was limited to the pericycle and the meristematic zones of root and stem. " It is suggested that factors such as position of growing point, rate of translocation, number of meristems, and toxicity to plant constituents may contribute to the limited response of the corn plant to 2,4-D."—D.B.

93 RODGERS, E. G. **Responses of corn [maize] to 2,4-dichlorophenoxyacetic acid.** *Proc. 8th N. Cent. Weed Control Conf., 1951* 1951, pp. 57-61, bibl. 7. [Fla Univ. Agric. Exp. Sta., Gainesville]

Applications of 1 lb. and 0.5 lb. per ac. of 2,4-D triethylamine salt acid equivalent, plus 0.25% Tide as a wetting agent, were made to 4 maize strains, WF9, W22, WF9 × Os420 and W22 × M14, at 7-day intervals on 8 dates starting at the 3-leaf stage and ending at the early tassel stage. The studies were made to determine : (a) the effect of 2,4-D applied at different growth stages on stalk brittleness in maize, (b) the effect of 2,4-D + N applications on stalk brittleness, (c) the effect of 2,4-D on the seed viability and seedling vigour of seed from treated plants, (d) the grain yield response of maize to 2,4-D treatments made at different growth stages. The results indicated that

W22 and W22 × M14 plants were considerably more susceptible to 2,4-D injury than were WF9 and WF9 × Os420 plants. Stalk brittleness was severe only in W22 and W22 × M14 plants, following 2,4-D spraying carried out at the 6- to 11-leaf growth stages. Brittleness became evident 2 days after treatment, reached a maximum within 5 to 11 days and disappeared within 18 days after treatment. Stalk breakage generally occurred in the region of brace-root formation, just above the 6th node and appeared to be associated with disturbed development of the hypodermis. Stalk brittleness caused by 2,4-D appeared to be associated with treatment made during periods of rapid internode elongation, or rapid shank elongation. Stalk breakage at harvest time was significantly greater in plants treated with 2,4-D at the 6-, 10- and 15-leaf stages, following manurial treatment with N, than where plants were similarly treated with 2,4-D but no N was applied. Shank breakage following 2,4-D treatment was greater than that of untreated controls only in the case of 2,4-D treatments made at the time of tassel emergence; N treatment slightly increased this effect of 2,4-D. The viability of the seed of W22 and W22 × M14 was reduced where 2,4-D was applied at the early tassel stage; the seedling vigour of the seed from treated self-pollinated plants was reduced most by 2,4-D treatment at early tassel stage, though in the case of WF9 plants, reductions in seedling vigour were noted following treatment with 2,4-D at almost all growth stages. Grain yield reductions were most serious following 2,4-D treatment at the 18-leaf (tassel emergence) stage, particularly in W22 and W22 × M14, poor grain development at the base of the ears being principally responsible for this effect. It is concluded that where 2,4-D is used for weed control in maize, it should be applied before the 6-leaf stage, or between the 11- and 16-leaf stages.—P.J.B.

94 VIEITEZ, E. El uso del cloruro 2,3,5-trifeniltetrazolium para determinar la vitalidad del polen. [**The use of 2,3,5-triphenyltetrazolium chloride to test the viability of pollen.**] *An. Edafol. Fisiol. veg.* 1952, **11,** No. 3, 297-308, bibl. 11, illus.

The viability of maize pollen grains was successfully determined by the use of 2.0% solution of 2,3,5-triphenyltetrazolium chloride. The tetrazolium salt was reduced to red triphenyl formazan by viable pollen whilst dead pollen produced no red colour. 50°C. was found to be the optimum temperature for the test.—W.J.B.

95 NORDEN, A. J. and others. **Some factors that affect protein content of corn** [**maize**]. *Quart. Bull. Mich. agric. Exp. Sta.* 1952, **34,** No. 3, 210-25, bibl. 24.

Shelled grain samples of 8 maize hybrids harvested at 3 stages of maturity from 3 different locations in 1948 and 1949 were analyzed for protein content which varied from 7.4 to 12.9% during the 2 years of the experiment, depending upon the season, location, stage of maturity and the hybrid. When maize followed lucerne in the rotation, protein content was higher than when it followed other crops. Under some conditions, the soil N supply was adequate for good yields, but inadequate for maximum protein content. Apparently the maize plant uses the available N first for growth processes related to maximum yield under the prevailing environment, and excess N not needed for those processes is devoted to an increase in protein. Genetic differences among hybrids were relatively more important in determining protein content than stage of maturity or locational differences in weather conditions and soil type. Hybrids tended to respond alike in both seasons, at all locations, and at all stages of maturity. There were significant differences among the hybrids in the amount of increase or decrease in protein from one set of conditions to another, but the hybrids that were high in protein content tended to be relatively high under all conditions. Earlier maturing hybrids did not necessarily have more or less protein than the later maturing hybrids in this study. Protein content decreased as the grain matured. Average protein content was 10.4, 9.9, and 9.8% when the average moisture content of the ear was 51.9, 40.7, and 31.9% respectively. There was no significant change in protein content after the moisture reached 40%. Considering the entire experiment regardless of season, location and hybrid, there was no relationship between yield of maize and protein content.—From authors' summary.

96 HUNT, C. H. and others. **The effect of maturity on the variation in protein, niacin, and pantothenic acid content of corn** [**maize**] **hybrids.** *Cereal Chem.* 1952, **29,** 142-7, bibl. 14. [Ohio Agric. Exp. Sta., Wooster]

Six open-pollinated maize hybrids were harvested at 9 dates between 9 October and 5 November, 1947, and between 24 September and 20 October, 1948, the grain being analyzed for protein, niacin and pantothenic acid content at each date. The mean protein content of the 6 hybrids decreased during maturation from 16 to 9.5% in 1947 and from 19.7 to 12.5 in 1948, the niacin content decreased from 45.4 to 26.3 μg. per g. in 1947 and from 54.3 to 22.4 μg. per g. in 1948, while the mean pantothenic acid content dropped from 17.0 to 5.1 μg. per g. in 1947 and from 19.7 to 4.1 μg. per g. in 1948. The niacin and pantothenic acid contents of the grain decreased faster than the protein content as the grain matured; the pantothenic acid content decreased faster than did the niacin content.—P.J.B.

97 EARLEY, E. B. and others. **Nicotinic acid, thiamine, and carotene content of kernels of medium and high protein corn [maize].** *Agron. J.* 1952, **44,** No. 6, 326-8, bibl. 8. [Illinois Agric. Exp. Sta., Urbana]

98 WOLF, M. J. and others. **Structure of the mature corn [maize] kernel. I. Gross anatomy and structural relationships.** *Cereal Chem.* 1952, **29,** No. 5, 321-33, bibl. 30, illus. **II. Microscopic structure of pericarp, seed coat, and hilar layer of dent corn.** *Ibid.* 334-48, bibl. 24, illus. **III. Microscopic structure of the endosperm of dent corn.** *Ibid.* 349-61, bibl. 14, illus. **IV. Microscopic structure of the kernel of dent corn.** *Ibid.* 362-82, bibl. 17, illus. [N. Reg. Res. Lab., Peoria, Ill.]

99 LANZA, F. Osservazioni sul sistema radicale in " *Zea mays indentata* " (ibrido U.32) e in " *Z. mays indurata* " (varietà " Nostrano dell' Isola alto "). [**Observations on the root system of dent maize, hybrid U.32, and flint maize, variety Nostrano dell'Isola, tall.**] *Publ. Roma, Sta. Chim.-agr. Sper. 68* 1951, pp. 9, bibl. 6, illus.

A preliminary trial was carried out in 1951 to study the root system of the maize hybrid U.32 and the variety Nostrano dell'Isola, each grown in 4 cement containers of 2 sq. m. each, at the rate of 5 plants per sq. m. Both the hybrid and the variety were of a medium vegetative cycle and great vegetative development, required deep, cool soil and were high yielding. The plants were sown on 11 May. On 12 July nearly all the plants had developed the male inflorescence. Half the plants of each type were examined on 19 July, and the other half on 26 September, when they had ripe ears and dry stems. The root system of U.32 did not appear to be longer or heavier than that of Nostrano dell'Isola, but its aerial part, the ear in particular, was more developed. Two plants of Nostrano dell'Isola and one of U.32, taken out of the soil on 19 July and placed in a basin containing water, but no nutrients, continued to grow and had normal ripe ears and dry stems 15 days before the plants grown in the soil.—E.B.O.

100 VAN WYK, S. P. **The use of maize-reaping machines.** *Fmg in S. Afr.* 1952, **27,** No. 313, 254-8.

Results are given of an investigation into the operation and efficacy of various machines, imported and local, for harvesting maize in South Africa. The conclusion is reached that the South African combines should, with improvements, be of great value to the South African maize industry. —K.L.

101 SPRENGER, J. J. I. Grundsätzliche und praktische Fragen der Maistrocknung. [**Fundamental and practical questions in maize drying.**] *Schweiz. landw. Mh.* 1952, **30,** 34-7, illus. [Cent. Inst. Landbouwk. Onderz. Wageningen, Netherlands]

An account, with comments, is given of the equipment and methods used in drying maize for seed and for fodder in the Netherlands. [From *Herb. Abstr.*]—D.B.

MILLET AND SORGHUM

102 NYASALAND AGRICULTURAL QUARTERLY JOURNAL. **Sorghums and millets.** *Nyasald agric. Quart. J.* 1951, **10,** No. 3, 80-1.

From observations on 111 varieties and strains of sorghums from various parts of Africa, it appears that the short-term, dwarf varieties do not produce satisfactory yields under Nyasaland conditions. The longer-term taller varieties are the most promising. Varietal trials with finger millet (*Eleusine coracana*) showed that the two most promising varieties were Phagalala and Fumbata, which gave yields of 1937 and 1880 lb. of grain per acre respectively.—K.L.

103 KOZYRJ, A. I. ***Setaria italica* in Dnepropetrovsk Province.** *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1951, **18,** No. 6, 36-8. [State Com. Var. Invest. Dnepropetrovsk Province]

In 1950, on the State Varietal Trial Grounds of the Province, 47 millet varieties, *S. italica*, were tested. The highest grain yields (31.4 to 36.5 centners per ha.) were given by the Chinese varieties Sjao-baĭ-ču, Dai-baĭ-ču, Lisoboĭ-Antohuan, Sjao-hun-ču 41, and Nju-to-gou. Of the local varieties, Ukrainskaja 38 and Cjurupinskaja 22 gave good results (32.6 to 33.5 centners grain per ha.). The regional variety Veselopodoljanskoe 367, yielded 25.7 centners per ha. According to the length of the growing period (154-159 days), these varieties of *S. italica* belong to the medium-late group. They ripen from 10 to 20 September. Early sowing gives the best results. Thus, when Ukrainskaja 38 was sown on 7 April, 1950, its grain yield was 33.6 to 37.1 centners per ha., but when sown on 25 April the yield was only 29.9 to 32.8 centners per ha.—R.P.J.

104 WILSON-JONES, K. **Three experiments in witchweed control.** *Emp. J. exp. Agric.* 1952, **20,** No. 78, 98-102, bibl. 3. [Minist. Agric., Sudan Govt]

The experiments were carried out in the Sudan in 1951, the witchweed being *Striga hermonthica*, parasitic on irrigated sorghum. In each experiment 1 to 2 lb. of the Na salt of MCPA or 2,4-D per feddan [1 feddan = 1.038 ac.] were sprayed on the sorghum plots at different dates after sowing the crop. In two experiments excellent control of *Striga* resulted from spraying the sorghum with either MCPA or 2,4-D between 14 and 28 days after sowing. Less satisfactory control was obtained as a result of spraying 35 days after sowing. Appreciable increases in grain and straw yields were recorded from the treated plots. The third experiment was a failure, the sorghum being killed by the weedkiller.—K.L.

105 LEBEAU, F. J. and others. **Anthracnose and red rot of sorghum.** *Tech. Bull. U.S. Dep. Agric. 1035* 1951, pp. 21, illus., bibl. 31. [Sug. Plant Invest. Div., Plant Industr. Bur., U.S. Dep. Agric.]

A history and description is given of leaf anthracnose and red rot of sorghum caused by *Colletotrichum graminicolum*, together with notes on the losses caused by this pathogen in the USA and the reaction of different sorgo, grain and broom-corn varieties of sorghum. The broom-corn and domestic varieties of sorgo in the USA were almost all susceptible to both phases of the disease. Only Atlas and Planter among the sweet-sorghum (sorgo) varieties showed marked resistance to leaf anthracnose. Of a number of grain-sorghum varieties, only one, Early Kalo, was susceptible to leaf anthracnose. In the case of the red-rot phase of the disease, considerably greater variation existed in respect to varietal resistance than was noted in leaf anthracnose resistance. Ten sweet-sorghum varieties were resistant to red rot, the variety Planter again being outstanding in its resistance. The grain sorghums appeared to be little affected by red rot. A high degree of leaf-anthracnose resistance was common among varieties introduced from Africa. The use of resistant varieties, combined with crop rotation, weed-free culture and seed treatment appeared to be the best means of control. Red-rot losses could be largely avoided by harvesting moderately susceptible varieties at the early-dough stage.—P.J.B.

106 VINOGRADOV, P. V. [**Pests of *Setaria italica* and their control.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 4, 70-5, bibl. in text. [Rostov State Sel. Sta.]

In 1950, under the conditions prevailing at the Station, *Setaria italica* was attacked by various insect pests, of which the most noxious were *Toxoptera graminum*, *Trigonotylus ruficornis*, *Phyllotreta atra* and *P. vittula*, *Pardilens calceatus*, *Gryllulus desertus* and the caterpillars of *Melicleptria scutosa* and *Chloridea dipsacea*. In combating *Toxoptera graminum*, the most serious pest, dates and methods of sowing exert a great influence: the optimal sowing date was 28 April; plots sown in continuous rows were less heavily attacked than those in which pocket-sowing was carried out. BHC proved highly effective in combating pests of *S. italica*.—R.P.J.

107 MUNTAÑOLA, Maria. La bacteriosis de los sorgos debida a *Pseudomonas andropogoni* (E. F. Smith) Stapp, en la República Argentina. [**Bacteriosis of sorghum due to *Pseudomonas andropogoni* in the Argentine Republic.**] *Lilloa* 1950, **23,** 307-17, bibl. 12, illus., English summary p. 307. [Univ. Tucumán, Argentina]

Symptoms of the disease and the behaviour of the bacteria causing it are studied. Humidity encourages attack and enables the bacteria to hibernate in the soil. *Sorghum technicum* is the sp. most severely affected in Argentina because of (a) its susceptibility, and (b) the fact that it is cultivated mainly in humid regions. In Tucumán, which has long periods of drought, bacteriosis is seldom observed in either *S. saccharatum* or the grazed sorghums. The grain sorghums prove very resistant both in the field and in the greenhouse. Control measures recommended are: rotation of crops, burning of stubble, and the prevention of too luxuriant growth.—G.M.R.

108 SAMUELS, G. and CAPO, B. G. **Effects of level of a fertilizer element on the uptake and concentration of that element and other elements in a plant.** *Agron. J.* 1952, **44,** No. 7, 352-7, bibl. 5, illus. [Agric. Exp. Sta., Rio Piedras, Puerto Rico]

Sorghum was grown in soils in which the levels of N, P, K, and Ca were successively varied. Increased applications of one element to the soil, gave higher concentrations of that element in the leaf. In some cases increased applications of one element depressed the concentration of other elements in the leaf. For example, successive applications of K lowered the concentration of N in the leaves of sorghum. "Ionic antagonism" need not be deduced from such an example, since, although the concentration of N was reduced, the actual weight of N present increased slightly. The reduced concentration of N is explained by the increased yield of the sorghum plant in response to additional K.—W.J.B.

RICE

109 LAUMONT, P. and LABY, H. Notes sur la culture du riz en Algérie. [**Notes on rice cultivation in Algeria.**] *Bull. Algeria Govt Gén. Inspect. Gén. Dir. Agric. Doc. Renseign. Agric. 178* 1952, pp. 32, bibl. 9, illus. [Serv. Exp. Agric.]

After giving data of rice areas and production in the world, particularly in Mediterranean countries, the present position of rice growing in Algeria is described. Various attempts were made in the past to develop rice cultivation, which is still in the experimental stage. The Service de l'Expérimentation agricole began rice trials in 1947, with encouraging results. Information is given on the requirements of the rice crop, its position in the rotation, soil preparation, manuring, sowing, varieties, irrigation, weed control, diseases, pests, harvesting and yield. It is concluded that there is a possibility of developing rice cultivation in Algeria (where up to 500,000 q. of rice are imported in some years), particularly in the irrigated salty soils of the Chéliff, provided that cost of production is low.—E.B.O.

110 NETTO, J. A. S. A cultura do arroz na Fazenda Coroputaba. [**Rice growing on the Coroputaba Estate.**] *Rev. Agric. Piracicaba* 1952, **27,** No. 1-2, 17-28.

An account is given of particularly successful rice growing on an estate in the fertile valley of the Paraíba, State of São Paulo, Brazil. The area comprises 1200 alqueires [in São Paulo 1 alqueire = 24,200 sq. m.], of which 50 are reserved for seed production. Mechanization, especially the replacement of the hand hoe by tooth harrows obtained from Germany, has greatly reduced the costs of production. Information is given on drainage, irrigation, tillage, manuring (mostly with cowpeas and *Lupinus albus*, ploughed under), sowing (only the area for seed is hand-planted), rolling, harrowing, harvesting, and the machinery employed in each case.—G.M.R.

111 DEMENTJEV, P. F. [**Experiment in the cultivation of rice (*Oryza sativa*) with periodic waterings in the Alhančurtsk valley, Grozny Province.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* (*Proc. Lenin Acad. agric. Sci.*) 1952, **17,** No. 7, 8-14, bibl. 2. [Exp. Irrig. Sta. All-Union Inst. Hydrotech. and Soil Improv.]

112 NYASALAND AGRICULTURAL QUARTERLY JOURNAL. **Rice and groundnuts.** *Nyasald agric. Quart. J.* 1951, **10,** No. 3, 81-3.

Observations on rice have confirmed the advantages of transplanting seedlings, grown in nurseries, over broadcasting the seed. The local rice variety Faya remains the most suitable type for local conditions. Yield trials on groundnuts have shown that the varieties Gambia and Spanish Bunch were better than other varieties and yielded 2006 lb. and 1163 lb. shelled nuts, respectively, at spacings of 2 ft. 6 in. by 10 in. In a seed rate and spacing trial, groundnuts sown at 2 seeds per hole gave significantly better yields than sowings of a single seed per hole. Experiments indicate that using the standard 3 ft. ridge, plantings of 3 rows per ridge at an intra-row spacing of 6 in. with 2 seeds per hole give the highest yield.—K.L.

113 SARAN, A. B. and PRASAD, M. **Ratooning in paddy.** *Curr. Sci.* 1952, **21,** No. 8, 223-4.

A trial was laid down at the Rice Experimental Area, Sabour, India, using Aus CH 10 rice, to determine the effect of harvesting at 4 different cutting heights on the yield of the subsequent ratoon crop. The treatments were randomized and replicated 6 times. The best ratoon-crop yield, equal to 31% of the yield of the preceding main crop, was obtained when the main crop was harvested at a cutting height of 14 in.—W.J.B.

114 STEEVES, T. A. **Wild rice—Indian food and a modern delicacy.** *Econ. Bot.* 1952, **6,** 107-42, bibl. 56, illus. [Biol. Labs, Harvard Univ., Cambridge, Mass.]

A review is given of a number of aspects of wild rice (*Zizania aquatica*), including its botany, ecology, value as a food plant and its present economic importance in the USA. Wild rice is an annual with a distribution ranging from the northern end of Lake Winnipeg to central Florida. It is best adapted in the USA to the margins of tidal rivers in the middle-Atlantic States and to the myriad of shallow lakes and ponds in northern Minnesota, Wisconsin and adjacent areas. Efforts have been made to introduce it into Britain as a food for game birds, but it has not met with much success, mainly owing to its poor seeding in our relatively low summer temperatures. It is considered that the variability of the species may provide a means of producing improved strains and that it may even be possible to produce strains adapted to terrestrial environments and thus provide a crop of agricultural value.—P.J.B.

115 FENAROLI, L. Una nuova avventizia, infestante le risaie (*Ottelia alismoides* Pers.). [**A newly introduced weed in [Italian] rice-fields (*Ottelia alismoides* Pers.).**] *Suppl. Ann. Sper agr.* 1952, **6,** 11-19, bibl. 33, illus., English summary p. 8. [Staz. sper. Maiscolt., Bergamo, Italy]

General information, including a botanical description and the geographical distribution, is given on *Ottelia alismoides*, a tropical water plant recorded as a weed in the rice-fields of China and Egypt. It was recently discovered in the rice-fields of Vercelli Province, where it is seeding abundantly. It appears to have been introduced into Italy as an impurity in imported rice seed.—E.B.O.

116 HARVEY, W. A. **Weed control in rice with MCP.** *Down to Earth* 1952, **8,** No. 1, 10-11, illus.

Notes are given on trials comparing 2,4-D, 2,4,5-T and MCPA for weed control in rice in California.

In hot weather, with temperatures ranging up to 110°F., 2,4-D has resulted in abnormalities in rice when applied at almost all growth stages. In relatively cooler conditions little damage to the crop has been caused by 2,4-D. Both 2,4-D and MCPA have given good control of broad-leaved weeds in continuously flooded fields. 2,4,5-T has given poor weed control and is not regarded as suitable. MCPA has given slightly inferior weed control to 2,4-D, but has caused few abnormalities in the crop at high temperatures.—P.J.B.

117 SÉCHET, J. Présence de la piriculariose du riz. [**The presence of blast, *Piricularia oryzae*, on rice (in Madagascar).**] *Agron. trop., Nogent* 1952, **7,** 152.

Blast appears to have been introduced recently into Madagascar. It was observed on rice crops in the region of Lake Alaotra in 1950/1 . The rice variety Makalioka 803 was particularly susceptible to the disease, while the varieties Makalioka 823 and Vary lava were resistant. The infection was greater on soils which do not retain water, e.g., peat soils, than on compact, clayey soils. To control this disease, resistant varieties should be grown. As a temporary measure of control, seed disinfection with methoxyethylmercury silicate is under study.—E.B.O.

118 RIEUF, P. La piriculariose du riz. [***Piricularia oryzae* on rice.**] *Terre maroc.* 1952, **26,** 91-3, bibl. 2.

General information is given on *Piricularia oryzae* on rice which appears to be a complex disease difficult to control. In Italy and other rice-growing countries, control is sought mainly by the use of resistant varieties and by preventive measures such as stubble burning, seed disinfection, and a wise use of fertilizers. Excessive applications of N favour the development of the disease. Little is known as to the value of fungicides in combating the disease. In Morocco, where rice growing is rapidly extending, the control of this disease is under investigation. It is thought that control of *P. oryzae* is greatly dependent on the vigour of the rice plant and can be achieved mainly by appropriate cultural methods. Amongst the control measures suggested are : field treatment of the plants with salts of ortho-oxyquinoline and seed disinfection with water at 55°C., or with copper salts, or organo-mercury preparations.—E.B.O.

119 PEIRIS, J. W. L. **Plant diseases. Bakanae disease and foot rot of paddy.** *Trop. Agriculturist* 1951, **108,** No. 3, 172-5, bibl. 9, illus. [Received 1952] [Div. Plant Path., Peradeniya]

Foot-rot disease (*Fusarium moniliforme*) of rice causes a seedling blight from which the plants usually die. Those which survive give rise to abnormally tall, infected tillers (which are responsible for the term 'Man rice' given to plants affected by this disease in British Guiana). As the disease can be soil-borne the stubble should be burnt wherever possible. It is largely seed borne, however, and control by seed dusting with Agrosan GN at the rate of 2 oz. per bu. is effective.—C.L.S.

120 BARR, H. T. and COONROD, L. G. **Bulk drying and storage of rice on the farm.** *Agric. Engng St. Joseph, Mich.* 1952, **33,** No. 3, 158-64, bibl. 8. [La Agric. Exp. Sta., Baton Rouge]

Data are given from 1 year's preliminary trials in Louisiana on storing and drying rice which indicate that there are possibilities for developing on-the-farm storage and drying of rice in the USA.—P.J.B.

JOB'S TEARS

121 SCHAAFFHAUSEN, R. **Adlay or Job's tears—a cereal of potentially greater economic importance.** *Econ. Bot.* 1952, **6,** No. 3, 216-27, bibl. 47, illus. [Sta. Amaro, São Paulo, Brazil]

A brief review is given of the literature on *Coix lachryma-jobi*, with particular reference to its present position as a cereal crop in Brazil. A dwarf variety has been grown successfully in many States of Brazil. This variety has outyielded rice and, in many cases, maize also. It is not attacked by birds, owing to its pliable stalks ; its growing season is about the same as that of maize and it is adapted to tropical, sub-tropical and temperate climates. Analyses of the whole grain have shown the following average composition : 13.6% crude protein, 6.1% ether extract, 8.4% fibre, 58.5% N-free extract and 2.6% ash.—P.J.B.

122 CASTELLANI, E. Un seccume fogliare del *Coix lachryma-jobi* L. [**Leaf blotch of *Coix lachryma-jobi* L.**] *Riv. Agric. subtrop.* 1952, **46,** No. 4-6, 159-65, bibl. 19, English summary p. 165.

Leaf blotch caused by *Curvularia* sp. was observed on crops of Job's tears growing near Viçosa, Minas Gerais State, Brazil. Control measures suggested (not yet tested) are seed disinfection and fungicidal treatment of the crops.—E.B.O.

GENERAL

123 BOYD, D. A. **The effect of seed rate on yield of cereals.** *Emp. J. exp. Agric.* 1952, **20,** No. 78, 115-22, bibl. 44. [Rothamsted Exp. Sta., Harpenden]

The results of available experiments [see extensive bibliography] carried out in the British Isles on the effect of seed rate on the yield of cereals are summarized, together with data from Scandinavian countries. The total number of experiments for the different cereals are: winter wheat 18; spring wheat 3; spring barley 16; spring oats 110. The main conclusion drawn from the data is that the optimum seed rates (about 2 bu. per ac. for wheat and barley and 4 to 5 bu. per ac. for oats) are considerably below those commonly in use. In many districts seed rates of 3 bu. of wheat and barley are common, whilst in the wetter districts 6 to 8 bu. of oats are often sown. The farmer should exercise his judgement to suit the circumstances of the particular field he is sowing. The seed rate should be reduced for early sown crops, or where take-all or eyespot is expected, or under high fertility conditions. The rate should be increased where soil pests are present, for late sowings and for rough tilths. Information on the influence of other factors such as time of sowing, row-spacing, and N dressings is scanty. Six experiments with both seed rate and N dressings as factors suggest that N responses are increased slightly as seed rate is increased. The results of Scandinavian experiments show a definite but small increase in the percentage of lodging with higher seed rates. Low seed rates are most successful under conditions of high fertility as judged by the level of mean yield. Simple factorial experiments including comparisons between varieties, N dressings and sowing dates in addition to seed rates, are still needed to indicate how far the foregoing conclusions should be modified with respect to these factors.—From author's summary.

124 KIESSELBACH, T. A. and LYNESS, W. E. **Production practices for spring small grains.** *Bull. Nebraska Univ. agric. Exp. Sta. 406* 1951, pp. 20, illus. [Received 1952]

Practical recommendations are given for cultivating oats, barley and spring wheat in Nebraska, based mainly on trials at Lincoln and in other parts of Nebraska. The results of many trials are given.—P.J.B.

125 TAMM, E. Über Beziehungen zwischen Witterungsverlauf und Ertragsleistung bei landwirtschaftlichen Kulturpflanzen im Land Brandenburg. 2. Beitrag: Sommer- und Wintergetreide. [**Relations between the weather and the productivity of crop plants in Brandenburg. 2. Summer and winter cereals.** *Z. Acker- u. Pflbau* 1950, **92**, No. 1, 100-24. [Inst. Acker- u. Pflbau, Berlin-Dahlem]

The author has evolved a system of marking and indices by which deviations of given climatic factors from the annual mean can be studied and correlated with crop performance. [A fuller exposition of his system is to appear in brochure form as the first contribution to this series of papers.] In this article, the system is applied to the consideration of yield statistics and weather records for those 2 years in the period 1922 to 1943 in which the highest yields of summer cereals (wheat, barley, oats and rye) and of winter cereals (wheat, barley and rye) were obtained, whereby for each of these crops an estimate is made of the weather requirements necessary for the attainment of optimal performance.—G.M.R.

126 BRETT, C. C. **The relative popularity of cereal varieties** [**in Britain**]. *J. nat. Inst. agric. Bot.* 1951, **6**, No. 1, 55-8.

Little information is available on the acreages sown to different cereal varieties in England and Wales. A guide to the relative popularity of cereal varieties can, however, be obtained by an analysis of the records from the Official Seed Testing Station. Tables are given separately for wheat, oats and barley showing the number of samples expressed as a percentage of the total number of named samples received for routine testing at the Station. Brief comments are given on the most significant trends which the tables bring out.—C.L.S.

127 THOMAS, E. and REEVES, J. **Cereal variety trials. Results of 1951 trials at research stations** [**in West Australia**]. *J. Dep. Agric. W. Aust.* 1952, **1** (3rd Ser.), No. 2, 231-8.

128 DAUPHIN, J. Quelques données sur le marché des semences de céréales. [**Some data on the market for cereal seeds.**] *Bull. tech. Inform. Minist. Agric. France 67* 1952, 155-9.

Information is included on the production of cereal seeds in France.—E.B.O.

129 ERROUX, J. L'organisation de la production et du commerce des semences sélectionnées en Algérie. [**The organization of the production of, and trade in, selected seed in Algeria.**] 1950, pp. 11, Oran. [Received 1952]

The origin and development of this organization is described. The production of selected seed is still insufficient in Algeria. The Service de l'Expérimentation is the only body concerned with selecting new crop varieties (mainly of hard wheat, soft wheat, barley, oats, pulses and potatoes).—E.B.O.

130 LAUMONT, P. and BLANCHARD, M. Le guide de l'agréeur de céréales en Algérie. [**A guide for judging the quality of cereals in Algeria.**] 1951, pp. 51, bibl. in text,

illus., Paris; Minist. Agric., Off. Nat. Interprofess. Cér. [Sta. Cent. Maison-Carrée, Alger]

It has become necessary in Algeria to standardize the methods used for estimating the quality of cereals in commercial transactions. This practical guide gives: general rules for judging the commercial value of a cereal seed lot, a description of the various factors which lower its value, and the methods used for taking and analysing an average cereal sample.—E.B.O.

131 KJAER, A. **Principles for the propagation and certification of cereal seed on the basis of field inspection, test plots and laboratory examinations.** *Proc. internat. Seed Test. Ass. Rep. 9th Congr., Copenhagen 1951* 1951, 361-74. [State Seed Test. Sta., Copenhagen, Denmark]

A general description is given of the operation of the official seed certification procedures used in Denmark, with the object of suggesting lines along which international seed certification standards might be established. It is suggested that internationally valid definitions be laid down for the following terms: elite seed, original seed, foundation seed and certified seed; and that international standards for the complete description of cereal varieties be drawn up.—P.J.B.

132 LAKON, G. Weitere Forschungen über das topographische Tetrazolium-Verfahren und die Ermittlung der Triebkraft. [**Further studies of the topographical tetrazolium colour test and the determination of seedling vigour.**] *Proc. internat. Seed Test. Ass. Rep. 9th Congr., Copenhagen, 1951* 1951, 255-66, bibl. 9, English summary pp. 260-1. [Landw. Hochsch., Hohenheim, Germany]

The tetrazolium biological seed-testing method for cereal seed has been adopted by German seed-testing stations; in Hanover, 12,000 tests have been made in the course of 1 year, using this method. It is hoped to extend the use of this method to legume, cruciferous and certain species of grass seed. In studies of the relation between the findings of the topographical tetrazolium test and the germinating energy of seed, a correlation has been found between the presence of necrotic areas in the radicle fraction of the embryo and the ability of saprophytic fungi to attack such areas and thus reduce the germinating energy of the seed. Where the radicle fraction of the seed has consisted entirely of living tissue, the embryo has been almost completely immune to fungus attack. Where the percentage of severely necrosed embryos has been deducted from the germination percentages arrived at by the tetrazolium test, the figure for germinating energy so obtained has remained constant within the permitted latitude for such determinations. [From *Herb. Abstr.*]—P.J.B.

133 TILEMANS, E. M. and DETROUX, L. Considerations sur l'utilisation des herbicides sélectifs dans les cultures de céréales. [**The use of selective herbicides in cereal crops.**] *Rev. Agric., Brux.* 1951, **4,** No. 5, 611-19.

This is a general review of the development and use of selective herbicides. The chemical composition of the herbicides is discussed and recommendations made for times and rates of application to the cereal crop. A table is given indicating the susceptibility of the principal weeds of cereals to MCPA, 2,4-D (sodium and amine salts and esters), DNOC and DNBP.—K.L.

134 SLAATS, M. and STRYCKERS, J. Gevoelige stadia van graangewassen bij behandeling met synthetische groeistoffen. [**Growth stages at which cereals are susceptible to herbicidal injury.**] *Meded. LandbHoogesch. Gent* 1951, **16,** 218-27, illus., English summary p. 227.

In trials carried out in Belgium during 1948-50, winter wheat, rye, winter barley, spring barley and oats were sprayed with aqueous solutions of 1 kg. per ha. of MCPA, 1 kg. per ha. 2,4-D Na salt, 0.85 kg. per ha. 2,4-D ester and 0.5 kg. per ha. 2,4-D amine salt, to determine the growth stages at which these cereals could be sprayed without injury. In all cases the crops were injured by spraying at the tillering stage; the safe period extended from the time tillering ceased to the time of heading. The safe period was relatively long in the case of winter cereals and short in spring-sown cereals. Winter wheat and oats were less susceptible to spike and spikelet abnormalities when sprayed during tillering than were rye and spring barley, though tillering and stem growth were more adversely affected in winter wheat than in rye. MCPA appeared to be the safest of the herbicides, though in the case of the oat trials the herbicidal properties of MCPA appeared to be less than those of the 2,4-D compounds.—P.J.B.

135 BATTS, C. C. V. **The distribution, host range and seasonal development of *Puccinia graminis* Pers. in south-east Scotland.** *Trans. bot. Soc. Edinb.* 1952, **36,** Pt. 1, 48-57, bibl. 5. [NIAB, Cambridge]

136 REITH, J. W. S. **Fertilizer placement for cereal crops.** *Emp. J. exp. Agric.* 1952, **20,** No. 78, 103-14, bibl. 17. [Macaulay Inst. Soil Res., Aberdeen]

During 1943-9, over 70 experiments were carried out on oats and barley to compare broadcast and combine-drill applications of various fertilizers. The results show that sulphate of ammonia can be safely drilled with oat seed at rates up to about 1.5 cwt. per ac. and, with few exceptions, the yields of grain are the same for both methods. Drilling superphosphate is more effective than broadcasting it, and 23-30 lb. P_2O_5 per ac. drilled produce yields at least as good as double the amount broadcast. Muriate of potash can be placed at rates up to 1 cwt. per ac. with the seed, but the present experiments show no significant benefit from drilling. It appears that potash salts should not be placed with cereal seed, particularly if sulphate of ammonia is drilled along with it. Mixtures of sulphate of ammonia and superphosphate can be safely drilled at rates supplying up to 30 lb. N and 80 lb. P_2O_5 per ac., respectively. Although the difference between the two methods is not large, drilling consistently produces slightly higher yields. It appears that up to 4 cwt. per ac. of an NPK mixture made from sulphate of ammonia, superphosphate, and muriate of potash, and containing 6% N and 12% K_2O, can be placed along with cereal seed. Drilling 3 to 4 cwt. of this mixture produces yields similar to 5 cwt. broadcast. As the percentages of N and K_2O in the fertilizer decrease, the rate at which it can be safely drilled can be increased. Placing superphosphate seems to allow the crop to take up its phosphate more quickly during early growth, and this may be the reason why drilling this fertilizer is superior to broadcasting it. There are no differences in the contents of N, P_2O_5 K_2O, and CaO in the mature grain and straw attributable to the two methods of application.—From author's summary.

137 GREAT BRITAIN. National Institute of Agricultural Engineering, Tech. Mem. **The moisture content of grain harvested by combine 1948 and 1949.** [n.d.], pp. 7.

The variation in the moisture content of grain harvested by combine was studied on 4 farms in 1948 and on 5 farms in 1949. It ranged from 33% for oats in 1949 to 11% for barley in 1949. The moisture content at which the grain was combined was not related to drying facilities on the farm.—C.L.S.

138 MAGEE, A. I. and KALBFLEISCH, W. **Moisture determination of silage, hay and grain.** *Sci. Agric.* 1952, **32,** 117-26, bibl. 6. [Cent. Exp. Fm, Ottawa, Canada]

Comparative studies were made of the efficiency of 9 rapid methods of determining the moisture content of silage, hay and grain on the farm. The methods used were as follows: (a) calcium carbide, (b) pressure, (c) internal-combustion engine exhaust, (d) tray drier, (e) tray drier with kitchen stove as heating unit, (f) tray drier with kitchen oven, (g) oil immersion, (h) common salt, and (i) relative humidity. The equipment and procedures for each method are described. With method (a) an accuracy of ±3% was obtained with hay between 20 and 75% moisture content. It was rapid and convenient to use. Method (b) was of little practical value. Methods (c), (d), and (e) were relatively accurate over a wide range of moisture contents; they were inexpensive and simple to operate, the only apparatus necessary being a balance, accurate enough to read in grams, and a thermometer. Methods (f), (g) and (h) were inaccurate with hay, though they could be used successfully with grain for estimating suitability for storage. [From *Herb. Abstr.*]—P.J.B.

139 GREAT BRITAIN. National Institute of Agricultural Engineering. Tech. Mem. **Grain harvesting and storage. Temperature determination in grain.** [n.d.], pp. 3.

In an experiment to determine if mercury-in-glass thermometers could be used to obtain accurate readings of temperature in bulk grain, it was concluded that an accuracy greater than 1°F. cannot be expected unless the thermometer remains in the bulk for at least 45 min.—C.L.S.

140 GREAT BRITAIN. National Institute of Agricultural Engineering. Tech. Mem. **Ventilated silos.** [n.d.], pp. 10, fig. 4.

In ventilated grain silos in which the drying air moves vertically upwards, the drying rate depends on a number of factors. Using several assumptions, the rate of evaporation of water per ton of material is proportional, and the drying time is inversely proportional, to the rate of airflow per ton of material.—C.L.S.

141 GREAT BRITAIN. National Institute of Agricultural Engineering. Tech. Mem. **Grain harvesting and storage. Report on a study of five methods of grain harvesting—1949.** 1951, pp. 18.

The results are given of an enquiry in 1949 into methods of grain harvesting with the object of providing preliminary information for further studies. Five methods of harvesting were studied, 2 using a binder, and 3 using a combine. The data are examined from many angles.—C.L.S.

142 DRICOT, C. and others. Le séchage des grains récoltés à la moissonneuse-batteuse. [**The drying of grain harvested by combine.**] *Rev. Agric., Brux.* 1951, **4,** 711-37, illus., English and German summaries p. 737. [Sta. Génie Rur., Gembloux]

The moisture content of cereal grain harvested by combine in Belgium varied from 13 to 22% in 1947 and from 14 to 30% in 1948. The following methods of drying grain, some of which are still in the experimental stage, are described: (1) cold air (using ordinary air or air dried with carbagel, a desiccating agent); (2) warm air, with the grain in sacks (platform and caisson-tunnel) or in bulk (kiln and cascade); (3) infra-red rays; (4) drying *in vacuo*.—E.B.O.

143 Hurlbut, L. W. and others. **Harvesting and conditioning grain for storage.** *Agric. Engng, St. Joseph, Mich.* 1952, **33,** No. 7, 421-4, bibl. 25, illus. [Neb. Agric. Exp. Sta., Lincoln]

The results are given of a number of promising experiments on the use of forced, unheated air for the drying of cereals. A schematic diagram is given which summarizes present recommendations for adapting bins to this method of drying.—P.J.B.

144 England and Wales. Ministry of Agriculture and Fisheries. **Grain drying and storage in Great Britain.** 1952, pp. 26, London, HMSO.

The rapid increase in the number of combine harvesters since 1946 and the difficulties in maintaining a smooth flow of grain in the harvests of 1949 and 1950 resulted in the setting up in 1951 of a small Working Party to review the problem and to consider to what extent the existing grain drying, handling and storage facilities in Great Britain needed to be supplemented. The recommendations of this Working Party are summarized on pp. 19-21 of this report.—C.L.S.

145 Darling, H. S. **Insects and grain storage in the Sudan.** [Reprint from] *Sudan Notes* 1951, **32,** Pt 1, 131-49. [Received 1952]

Primary and secondary insect pests of stored grain in the Sudan are listed and brief accounts are given of their biology and their ecological requirements. Factors affecting the incidence of insects in stored grain are discussed. Grain particle-size, grain moisture-content and grain temperature all affect the development of insect infestations. It is possible that the carbon dioxide concentration of the inter-granular air may also affect the incidence of grain pests. Control of grain pests by appropriate management is discussed. Grain moisture-content appears to be of major importance. The dry northern Sudan is very suitable for grain storage, since in such areas the grain becomes so dry that insect activity is reduced to a minimum. In the humid southern Sudan mechanical grain-drying is a necessary preliminary to long-term storage. An outline is given of control methods making use of insecticides. Inert dusts, chemical insecticide dusts and fumigants are briefly discussed.—Author's summary.

LEGUMES

SOYABEAN

146 Seed World. **Dorman soybean is released for seed increase.** *Seed World* 1952, **71,** No. 4, 8, illus.

Dorman is well adapted to the alluvial soils of the Mississippi Valley and the region between south-eastern Missouri and north-eastern Louisiana, where it will replace S100 and constitute a variety adapted to the areas between those to which Perry and Ogden are adapted. Dorman has an oil content 2.5 to 3% higher than S100, which it usually out-yields. Dorman is 10 days later in maturing than Perry and 14 to 18 days later than Ogden.—P.J.B.

147 Borrero, A. P. Contribución a la inoculación bacteriana de semillas de soya. [**Bacterial inoculation of soyabean seed.**] *Acta agron., Palmira* 1952, **2,** No. 1, 53-72, bibl. 15, illus. [Univ. Palmira, Colombia]

In studies of soyabean inoculation in tropical regions, this practice was found to be necessary if good yields were to be obtained from soil which had not previously grown this crop. Experiments in sand, in the greenhouse and in the field, showed that there is a loss of virulence in bacterial action when soyabeans are grown for a second and third time in succession in the same soil. The loss is expressed in the formation of numerous abnormal, swollen lateral roots and of abnormal nodules. Either there should be a change of crop or the second and third sowings should be accompanied by re-inoculation.—G.M.R.

148 Lynch, D. L. and Sears, O. H. **The effect of inoculation upon yields of soybeans on treated and untreated soils.** *Proc. Soil Sci. Soc. Amer.* 1952, **16,** 24-6, bibl. 4. [Agric. Exp. Sta., Urbana, Ill.]

Studies were made of the yield from inoculated and uninoculated soyabeans grown at a number of locations in Illinois on fields that had received a wide range of previous manurial treatments and all of which had been cropped systematically for the past 30 years, though none had been under soyabeans for a number of years. The results showed that there were no significant differences between the yields of inoculated and uninoculated soyabeans grown on the same plots, though plots with a total soil content of under 3000 lb. N per ac. gave a high proportion of yield increases following inoculation, compared with where no inoculation was made. It is considered, however, that owing to the small yield increases of inoculated over uninoculated crops on many plots, inoculation should be carried out as an inexpensive insurance measure. Soyabean *Rhizobia* apparently survived for many years in the absence of the host plant and in soils with a pH as low as 4.2.—P.J.B.

149 Luedecke, H. and Poschenrieder, H. Weitere Beobachtungen und Versuche über die Arteinheit bei den Knöllchenbakterien der Leguminosen. [**Further observations**

and experiments on specificity in the nodule bacteria of the legumes.] *Z. Acker-u. Pflbau* 1951, **94,** No. 2, 133-45, bibl. 13.

noculation experiments with peas, lupins and oyabeans grown in pots were conducted in 1939 at he Anhalt Experiment Station, Bernburg. The xpressed sap of soyabean nodules induced nodule ormation in soyabeans. Inoculation of soyaeans with the pea nodule sap, however, although t produced good nodule formation, did not result n any increase of green weight in comparison with he uninoculated control. Inoculation of lupins vith the sap of soyabean nodules and of soyabeans vith that of lupin nodules was ineffective. Comarison of various inoculants showed some comnercial preparations to be more effective both for upins and soyabeans than the expressed sap of the espective root nodules.—G.M.R.

50 WILLARD, C. J. **Ohio experiments on the chemical control of weeds.** *Soybean Dig.* 1952, **12,** No. 6, 12-13.

f a number of herbicides tested at Oklahoma gricultural Experiment Station, only DNOSBP, pplied as a pre-emergence treatment at the time f sowing and at a rate of between 5 and 10 lb. er ac. of active ingredient, was effective in conolling weeds in soyabeans, without materially amaging the crop.—P.J.B.

51 NITTA, K. [**Studies on the oil and protein contents of soyabean seed.**] [Japanese] *Res. Bull. nat agric. Exp. Sta. Hokkaido* 1952, No. 63, 64-9, bibl. 6, English summary p. 69.

high correlation was found between the maturity the soyabean and the oil and protein content of s seeds ; the earlier the maturity of the variety, e higher the oil content ; the later the maturity, e higher the protein content.—From résumé.

2 FREIBERG, S. R. **Effects of an exogenous growth regulator on proteolytic enzymes of the soybean plant.** *Science* 1952, **115,** No. 2999, 674-5, bibl. 9. [Plant Physiol. Dep. Rutgers Univ., New Brunswick, N.J.]

yabean plants 38 to 40 cm. high, with 6 fully panded trifoliate leaves, were placed in nutrient lutions containing 5 ppm 2,4-D for 24 hr. At e end of 5 days after treatment, the proteinase d polypeptidase activity of the leaves decreased, ile that of the stems and roots increased conerably, compared with untreated controls.— .B.

3 SIEGEL, J. J. and others. **The effect of calcium on the growth of soybeans supplied with ammonium nitrogen.** *Proc. Soil Sci. Soc. Amer.* 1952, **16,** 185-8, bibl. 11. [Mich. Agric. Exp. Sta., East Lansing]

abeans were grown in different sterile solution cultures containing 120 ppm nitrate, ammonium, or amino acid N, each combined with 50, 100 and 150 ppm Ca. After 4 weeks' growth, the plants growing in the nitrate N solutions were healthy and vigorous and those in the amino acid cultures were deep green in colour, had grown well and had begun to flower and set pods ; the plants growing on the ammonium N were almost completely necrotic, only those growing in the solutions containing 150 ppm Ca showing any green tissue. In the case of the plants growing in solutions containing nitrate N, the higher the Ca concentration present, the greater the Ca content of the plants and the lower their K and Mg content ; there was little difference in protein content at the different concentrations of Ca. The protein content of the plants grown in solutions containing ammonium N was nearly double that of those grown on the nitrate N cultures ; plants grown in solutions containing 50 ppm Ca contained no more Ca than was originally present in the seed, indicating that almost no Ca was taken up by the roots where the Ca content of the cultures was low. The plants grown in the amino acid solutions contained 18% more protein, set seed earlier and produced less vegetative growth than those supplied with nitrate N. It appeared that for plants supplied with ammonium N, larger amounts of mineral cations were necessary than where they were supplied with nitrate N, indicating that ammonium N enters into the cation/anion ratio. Plants grown on soils fumigated with Dowfume N to inhibit nitrification and promote the accumulation of ammonium N, made better growth with a high, than with a low Ca content in the soil ; growth on fumigated soils with a high Ca content was better than that on unfumigated soils with either a high, or a low, Ca content. These results indicate that where ammonium N is supplied to soyabeans, a high level of soil Ca is necessary to ensure good growth.—P.J.B.

GROUNDNUT

154 CAPININ, J. M. and GUEVARA, V. F. **The floral biology and fructification of peanut,** ***Arachis hypogaea.*** *Philipp. Agriculturist* 1951, **35,** No. 3, 137-42, bibl. 2, illus. [Philipp. Agric. Coll., Laguna]

The results are given of a study of floral biology and its relation to pod formation in runner- and bunch-type groundnuts.—P.J.B.

155 GILLIER, P. and ORGIAS, A. Action des oligoéléments sur l'arachide. [**Effect of minor elements on groundnuts.**] *Oléagineux* 1952, **7,** 411-12, bibl. 5. [Cent. Rech. Agron., M'Bambey, Senegal]

A trial was carried out in 1951 to study the effect on groundnuts of Mg, Mn, Cu, Fe, Mo and B, applied with a complete fertilizer in the pelleted form. The creeping groundnut variety 24-11 was sown on 15 July on plots 3 × 12 m. The pellets were applied on 3 August and the plants were harvested on 12 November. A table gives the average yield of unshelled nuts and the average weight per seed resulting from each of the treatments. The yield of unshelled nuts obtained from applying Cu and Mo was 9% higher, and that from Mg 6% higher, than the yield from the control which received the fertilizer only. The seed-weight was 4% higher than the control with Cu and Mo applications and 3.5% higher with B application. The effect of the other minor elements was either nil or very small.—E.B.O.

156 MINAKOV, N. N. [**A new method for field drying of groundnuts (*Arachis hypogaea*).**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 7, 76-7.

A method is described for drying this crop in the field on sieves or frames, arranged in the form of a pyramid, so that drying is completed in 6 or 7 days. Drying on frames gives a high-quality hay.—R.P.J.

157 BAKER, V. H. and others. **A continuous drying process for peanuts.** *Agric. Engng, St. Joseph, Mich.* 1952, **33,** No. 6, 351-6. bibl. 12, illus. [Virginia Agric. Exp. Sta., Blacksburg]

This paper summarizes the results of 3 years' studies on the fundamental factors involved in drying groundnuts, including the effect of temperature, relative humidity and rate of air flow on the rate of drying, seed germination and quality of the dried product. Data are given on the air-flow resistance of dry, unshelled Virginia Runner and Holland Jumbo Runner groundnuts and this information has been used to provide the basic information for constructing a continuous drier.—P.J.B.

PEA

158 EGGINK, H. J. Chemische onkruidbestrijding in erwten. [**Chemical weed control in peas.**] *Maandbl. LandbVoorlDienst* 1952, **9,** 83-6. [Cent. Inst. Landbouwk. Onderz. Wageningen, Netherlands]

General observations are given on the use of calcium nitrate, DNBP and DNOC for weed control in peas, together with the summarized results of trials in the Netherlands with these herbicides during 1950 and 1951.—P.J.B.

159 ASHDOWN, D. and CORDNER, H. B. **Some effects on insect control and plant response of a systemic insecticide applied as a spray, a seed treatment, or a soil treatment.** *J. econ. Ent.* 1952, **45,** 302-7, bibl. 5. [Okla. Exp. Sta., Stillwater]

Diethoxythiophosphoric acid ester of 2-ethyl mercaptoethanol, applied either to the seed or in the soil, effectively controlled the pea aphid, *Macrosiphum pisi*, on peas throughout the 80 days between sowing and harvesting. Somewhat less effective control was obtained by spraying the foliage of untreated plants 40 days after sowing. Seed germination, as indicated by plant emergence, was not influenced, nor was the growth permanently affected, by the toxicant. Residue analyses showed only traces of the toxicant in all but the soil-treated peas which contained 1.6 ppm.—E.B.O.

160 COMPTON, Winifred. **The effects of maleic hydrazide on growth and cell division in *Pisum sativum*.** *Bull. Torrey bot. Cl.* 1952, **79,** 205-11, bibl. 7. [Bot. Dep. N. Carolina, Chapel Hill]

Pea seeds were soaked for 12 hr. in 10, 50, 100, 300, 500 and 1000 ppm solutions of maleic hydrazide, washed with distilled water and then germinated in darkness. Observations were made on the seedlings for 1 week after germination, following which they were planted in vermiculite and studied for 1 month. Growth and cell division were inhibited by maleic hydrazide concentrations of 100 ppm and above, while the 10 and 50 ppm concentrations did not inhibit growth as compared with untreated controls. Maleic hydrazide appeared to have a more pronounced inhibitory action against cell division in the roots than in the shoots. Plants treated with high concentrations of maleic hydrazide exhibited inclusions in the leaves. These inclusions gave negative reactions to tests for starch, protein and fat and were regarded as possibly some type of polysaccharide other than starch, accumulated in the tissues as a result of failure of food assimilation, or a reduced rate of respiration.—P.J.B.

161 MUEHLEISEN, R. Untersuchungen über den Blüten- und Hülsenansatz sowie über die Qualität der Erbsen. [**Studies of flower and pod setting and of quality in peas.**] *Z. Acker- u. Pflbau* 1951, **94,** No. 1, 59-98, bibl. 124. [Inst. Pflbau u. Pflzücht., Stuttgart-Hohenheim]

1. Flower and pod setting. A preliminary trial was made in 1947 to determine whether manurial treatment affects pod setting and which nutrients are of special importance. As a result the principal trial in 1948 compared the following treatments: no watering, watering, NP, NPK, NPKCa, PK, PKCa. Counts were made using 325 plants in each plot. The following are among the findings

recorded: different manurial treatment resulted in great differences in the total number of flowers produced. The number of flowers which fell was insignificant; the number of pods which dropped was much greater. Watering reduced the number of flowers which dropped by one-half, and also produced the highest percentage of pod-setting, *viz.* 85.%. On an average, 77% of the flowers set pods. A single watering increased the total number of flowers by 40% compared with unwatered. The NPK plot had the greatest yield per plant. The addition of Ca reduced yield per plant. P exceeds K in importance and effect. 2. Studies of quality. Determinations were made in 1947 and 1948 of: thousand-seed weight, dry matter, ash, crude fat, crude and pure protein, the proportion of seed coat, and cooking and swelling capacity. Findings are discussed in relation to weather conditions. The relations between the different components of quality are also discussed.—G.M.R.

BEAN

162 JUDENKO, E. and others. **The effect of *Aphis fabae* Scop. on the growth and yield of field beans in a garden plot.** *Plant Path.* 1952, **1,** No. 2, 60-3. [Ent. Dep., Rothamsted Exp. Sta., Harpenden, Herts.]

The black bean aphid, *Aphis fabae*, can cause complete failure of field-bean crops. A trial was carried out in 1948 to study the bean yield in relation to a moderate aphid infestation. Tick beans were grown in a plot 30 sq. ft. and alternate plants kept free from aphids by daily hand-picking. Results showed that, even with only a moderate infestation over a 2-month period from the beginning of the attack and with a good opportunity for the plants to grow for 2 months after the disappearance of the infestation, the reduction in bean yield was 43%.—E.B.O.

163 WATSON, D. P. **Retardation in cell development in leaf and flower buds of *Phaseolus vulgaris* L. from foliar applications of maleic hydrazide.** *Bull. Torrey Bot. Cl.* 1952, **79,** 235-41, bibl. 13. [Mich. Agric. Exp. Sta., East Lansing]

Bean plants were grown in nutrient solutions under conditions of controlled light and temperature. 25 plants with terminal buds 3 to 4 mm. long were sprayed with a 500 ppm solution of maleic hydrazide. The leaves of the plants failed to expand laterally, there was inhibition of cell development, but no abnormal cell multiplication. Abscission, followed by the rapid growth of axillary buds was noted. Flower development in the bud was delayed by the treatments, though reproductive parts had developed in the buds before abscission occurred.—From author's summary.

Lathyrus sativus

164 BHIDE, V. P. and DHANDE, G. W. **Wilt on lang [*Lathyrus sativus*].** *Farmer, Bombay* 1952, **3,** No. 6, 35-7.

Lang occupies an area of about 50,000 acres annually in the Broach District of Bombay State. It is chiefly grown for green fodder, but its grain is also exported or used for food in times of scarcity. It is known as lakh in Madhya Pradesh and khesari in North India. In 1935-6 a destructive wilt disease [scientific name not given] appeared. Breeding has resulted in a wilt-resistant strain, Indore T. 2-12, which is earlier, yields more and has now largely replaced the local lang varieties of Broach. [From *Herb. Abstr.*]—C.L.S.

165 RUDRA, M. N. **Toxic principle of *Lathyrus sativus*.** *Nature, Lond.* 1952, **170,** No. 4316, 124-5, bibl. 9. [Dep. Med. Chem., Darbhanga Med. Coll., Laheriasarai, Bihar]

" The toxic substance of *L. sativus* responsible for lathyrism has been identified as selenium. *L. sativus* is much richer in selenium content than other pulses which are harmless." In this article, [of interest primarily to the medical profession] the selenium content of the following species is recorded (mgm./100 g. dry): *Phaseolus radiatus* 2.5; *Pisum sativum* 1.2; *Cicer arietinum* 5.0; *Lens esculenta* 2.3; *Lathyrus sativus* 22.9.—M.H.

CHICKPEA

166 GUZOVSKIĬ, M. [**Methods and rates of sowing of chickpea.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1951, **18,** No. 8, 67-9. [Celinskiĭ State Var. Plots, Rostov Province]

In experiments with chickpea (*Cicer arietinum*), sowing in drills 15 cm. apart gave a higher yield than when the drills were 45 cm. apart. On the average, the former method gave a yield 2.6 to 2.8 ctr./ha. greater than the latter.—R.P.J.

GENERAL

167 TOXOPEUS, H. J. **A thornless variety of *Mimosa invisa*. A great improvement of one of the best tropical green manures.** *Euphytica* 1952, **1,** No. 2, 130-2, illus. [Inst. Agric. Plant Breed., Wageningen, Netherlands]

A note is given on a thornless mutant of *M. invisa* found in Java in 1942 and now cultivated over a large area of the estate where it was found. The mutant does not appear to differ from the normal, thorny plants, save in its lack of thorns. This mutant is considered to be of great promise for land reclamation in the tropics.—P.J.B.

168 Tamm, E. Über Beziehungen zwischen Witterungsverlauf und Ertragsleistung bei landwirtschaftlichen Kulturpflanzen im ehemaligen Regierungsbezirk Potsdam. 4. Beitrag: Körnerleguminosen. [**Relations between the weather and the productivity of crop plants in the former Government district of Potsdam. 4. Pulses.**] *Z. Acker- u. Pflbau* 1951, **94,** No. 2, 166-89, bibl. 3, chart 1. [Inst. Acker- u. Pflbau, Berlin-Dahlem]

A study of the weather conditions in those 2 years of the period 1922-43, in which the highest yields of peas, vetch, field beans (*Vicia faba*) and lupins were obtained, leads to an estimate of the weather conditions necessary for the attainment of optimal performance in these crops. [See Abs. 125 and 189.]—G.M.R.

ROOTS

SUGAR-BEET

169 Harvey, P. **Topped but unlifted beet: a three-year trial.** *Brit. Sug. Beet Rev.* 1952, **21,** No. 1, 33-6 and 43. [Norfolk Agric. Sta., Sprowston]

An account is given of 3-year trials carried out at the Norfolk Agricultural Station and at various factory centres on the changes occurring in sugar-beet which had been topped and left in the ground for varying periods of time. In each of the replicated trials at the Norfolk Agricultural Station, one group of plots was topped by hand hoe at the beginning of the trial and the yield and sugar content of the roots measured at the time of lifting and thereafter at weekly intervals until 4 weeks after topping. At each time of lifting, control plots, with their tops intact, were harvested in the usual way for comparison with the topped plots. The factory trials consisted of 2 plots, one topped in the ground at the beginning of the trial period and the other left to grow normally. Most of the trials were topped by machine and 4 were topped by Dutch hoe. The main conclusion from the Norfolk Agricultural Station's experiments is that in all 3 years, the beet topped in the ground at the beginning of October lost about 1% in sugar content in the first week after topping and about 0.5% for the corresponding period in November. During the second week, however, the rate of loss slowed up in October, but not in November, so that after being left in the ground for a fortnight the topped beet had lost about 1.4% sugar in both months. Thereafter the sugar content declined more slowly until after 4 weeks in the ground the total loss during each of the trial periods was 2%. This was confirmed by the factory trials where the total loss in sugar percentage during the 28-day period was roughly 1.8%, of which half occurred during the first week. From these results it appears that a lower financial return per ac. must be expected from sugar-beet that has been topped and left in the ground, and this must be set against the possible advantages of clearing the tops ahead of the lifter for ease of conservation or to aid in the organization of the harvest.—K.L.

170 Jorritsma, J. Het optreden van verliezen bij het oogsten en bewaren van suikerbieten. [**Losses in sugar-beet under different harvest and storage conditions.**] *Meded. Inst. rat. Suikerprod.* 1952, **22,** No. 1, 1-44.

The results are given of trials in the Netherlands during 1949-51 to determine: (a) losses of sugar in sugar-beet left in the soil for different periods after topping, (b) changes in sugar-beet loosened, but left partially in the soil for a period before topping, (c) changes in harvested sugar-beet left in the field in small heaps, some covered with tops and some left uncovered, (d) sugar losses in sugar-beet stored on the farm in large ventilated and unventilated clamps. In trial (a), the sugar-beet was usually topped in early October and the roots then left in the soil for up to 4 weeks. Mean sugar losses were 275 kg. per ha. per week. Losses were considerably higher during the first week after topping than during subsequent weeks and highest in warm, dry weather. The decline in sugar content in topped roots was comparatively unaffected by weather conditions. In trial (b), dates of lifting were early and late October, with topping and harvest at successive weekly intervals, up to 4 weeks later. Root weights varied considerably according to weather conditions, but sugar content remained relatively constant, or even increased in some cases, particularly in cool weather where the soil was damp. In trial (c), 1949 and 1950 harvest conditions were warm and the soil damp; the sugar beet was not fully mature at harvest. In 1951, the sugar-beet was fully mature at harvest. In 1949 and 1950 sugar losses in heaps of about 50 roots were much larger than those in 1951. In 1949, the mean loss of sugar in uncovered heaps was 150 kg. per ha. per week and 65 kg. per ha. per week in covered heaps; in 1950, respective losses were 258 and 185 kg. per ha. In 1951, losses in covered heaps were greater than in uncovered heaps, the respective mean figures being 57 kg. per ha. per week and nil. In trial (d), only one year's results are given. Over a period of 12 days from 21 November to 3 December, sugar losses were 1140 kg. per ha. for unventilated clamps, compared with 660 kg. for ventilated clamps, these figures being calculated on a basis of 60,000 roots per hectare. Air temperatures during the storage period were relatively high.—P.J.B.

171 Koehnlein, J. and Fense, H. Siebenjähriger *Beta*-Rüben-Versuch auf Lehmböden im Osten Schleswig-Holsteins. [**Seven**

years' beet trials on loam soils in the east of Schleswig-Holstein.] *Z. Acker- u. Pflbau* 1951, **93,** No. 3, 338-46, bibl. in text. [Dairy Res. Sta., Kiel, Germany]

comparison is made of the performance of fodder-eet distinguished for bulk production, those istinguished for content of dry matter, and sugar-eet, represented by 6 varieties grown in trials xtending from 1941 to 1948. The following are nong the conclusions reached: the higher the ry-matter content of the root, the lower is the esh-weight root yield and the higher the yield of aves. There is, however, no equalization of otal fresh-weight yield through the increase in the roportion of leaves, but total yield—taking the verage as 100—falls from 114 in a bulk beet to 86 a sugar-fodder-beet and 89 in a sugar-beet. omparison of dry-matter yield of the roots shows considerable degree of uniformity in all the arieties. Crude protein yield in the beet falls ith increasing dry-matter content and in the leaf ses with yield of green weight. As the dry-atter content of the beet and the yield of leaves e correlated, there is little difference between the rieties in their total crude protein yield. All the rieties were found to remove approximately ual amounts of calcium and phosphoric acid from e soil, while the uptake of potassium decreased dry-matter content of the beet increased and so s higher in the bulk beet than in the sugar-beet. G.M.R.

2 VASJKO, N. D. **[Ways of increasing yields and sugar content of sugar-beet on salt soils.]** [Russian] *Počvovedenie* (*Pedology, Moscow*) 1952, No. 5, 451-60, bibl. 21. [All-Union Sci. Res. Inst. Sug.-Beet (VNIS), Kiev]

esults of former studies on this subject have been nflicting. The present work [primarily soil alyses in relation to sugar content and root ight of sugar-beet varieties (not named)] was rried out in 1942-4 in the beet areas of Uzbek R on solončak grey earths. The effect of salt ls on sugar-beet growth is extremely complex, pending on many factors which influence the nt during the whole of its vegetative period. ere is evidence that root weight is determined re by vegetative growth which is induced by reased concentration of the nutrient solution in soil, than by accumulation of sugar in the root. ring the vegetative period, as the root weight reases under increased osmotic pressure of the l solution, the accumulation of sugar in the root ess active. From a study of the soil and climatic nditions in the beet-growing areas of Soviet ntral Asia it is concluded that breeding work uld be initiated for the production of varieties h high sugar content which are at the same time apted to salt soils and to high temperatures of h soil and air.—M.H.

173 PENMAN, H. L. **Experiments on irrigation of sugar beet.** *J. agric. Sci.* 1952, **42,** No. 3, 286-92, bibl. 11. [Rothamsted Exp. Sta., Harpenden, Herts.]

The paper describes 4 field experiments in which attempts were made to control the water content of the soil throughout the growing season by irrigation from overhead spray-lines. In spite of differences in season and soil, the 4 sets of data are consistent in showing that maximum sugar yield is obtained when the soil-moisture deficit (amount of rain or irrigation needed to restore the soil to field capacity) does not exceed about 2 in. in mid-July, or about 4 in. in mid-September.—From author's summary.

174 THOMPSON, E. G. **Trials of sugar beet strains.** *Brit. Sug. Beet Rev.* 1952, **21,** No. 1, 25-8.

This is a continuation of the results of trials on sugar-beet strains previously reported in *Fld Crop Abstr.* 5 : 483. As the results of the 1951 trials agreed so closely with those of the previous year there is no justification for any extensive alteration in the choice of strains for particular conditions.—K.L.

175 GASKILL, J. O. **A new sugar-beet breeding tool—two seed generations in one year.** *Agron. J.* 1952, **44,** No. 6, 338. [U.S. Dep. Agric., Fort Collins, Colo.]

An outline is given of a method of producing 2 successive seed crops of sugar-beet within 12 to 13 months, by means of pre-induction, induction and post-induction treatments.—P.J.B.

176 ERDMANN, K. Verfahren zur Erzielung von vollwertigen Samenträgern der *Beta*-Rübe im ersten Vegetationsjahr mit Hilfe von Kältebehandlung. **[Experiments to obtain perfect seed-bearing plants of beet in the first year of growth by means of cold treatment.]** *Züchter* 1950, **20,** 291-6, bibl. 18, illus. [Received 1952] [Univ. Greifswald, Germany]

In October, 1948, seed of several varieties of fodder- and sugar-beet was germinated on filter paper at a temperature of 16 to 18°C. and allowed to continue growth (in a greenhouse) at a temperature of 12°C. Cold treatment was given in two ways, variable and constant, termed "natural" and "artificial," respectively. One series of plants (in this case fodder-beet only) was given a variable cold treatment by transference in early spring from the greenhouse to a cold frame for hardening. In May the plants were transplanted in the open. Of the varieties tested Ovana showed the highest percentage of bolting (84% of survivors). In the second series, plants (both fodder- and sugar-beet) were subjected to a constant cold treatment in May when the seedlings were about the size of a strong radish. The soil was shaken off the roots of the individual plants, the outer leaves removed, and the plants placed in an ice cabinet for several days at a constant temperature of 0°C. after which they were transplanted in the open air. Observations were then made on bolting. This began earlier in the fodder-beet than in the sugar-beet plants. Of the fodder-beet transplants, the following varieties showed 100% bolting by September; Veni vidi vici, Ovana, Schreibers grünköpfige and Jaenschs Teutonia. Of the sugar-beet, 93 to 98% of the transplanted individuals of the varieties Kleinwanzleben and Rimpau had bolted by September. Of the varieties named above, the percentage germination of the seed produced was between 72 and 94. The seed-balls of these beet plants, which had become annuals, were of considerable size. [From *Herb. Abstr.*] [See also next abstract.]—D.B.

177 ERDMANN, K. Verfahren zur Erzielung von Samenträgern der *Beta*-Rübe im ersten Vegetationsjahr mit Hilfe von Kältebehandlung. [**Experiments to obtain seed-bearing plants of beet in the first vegetation year by means of cold treatment.**] *Züchter* 1951, **21,** 110-15. [Received 1952] [Univ. Greifswald, Germany]

Following the experiments recorded in the previous abstract, experiments were conducted to find out (1) the best age for treatment of plants and (2) the relationship between the amount of seed produced by the annual and biennial beet plants. The two ages investigated were 9 weeks and 4 months. From the results it was clear that plants should be at least 4 months old when cold-treated if they are to flower and set seed within 1 year and, judging by the previous year's results, older plants of 6 months are preferable. Plants treated at 4 months old produced, within the year, almost half as many seed-bearing individuals as those which had been allowed to grow normally for 2 years. The histories of cold-treated fodder- and sugar-beet varieties, from planting to seed production, are tabulated. [From *Herb. Abstr.*]—D.B.

178 ORLOVSKIĬ, N. I. [**The influence of conditions of growth of sugar-beet on the productiveness of its next generation.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 4, 60-4. [All-Union Sci. Res. Inst. Sug.-Beet, Kiev]

Results are reported of a 1948 experiment with sugar-beet variants grown with soil humidities of 60% and 25% respectively. With 60% soil humidity, the weight of leaf and root and the yield of sugar in plants raised from seeds obtained in the previous generation under conditions of high soil humidity (60%) showed a marked increase, compared with plants raised from seed obtained in the preceding generation under conditions of drought (25% soil humidity in 1946/7), the increase in the yield of sugar in the variety I-1305 amounting to 25%, and, in the variety B-23, to 32%. The difference in the weight of the roots in these variants was from 31 to 38%. In variants grown in 1948 with 25% soil humidity, plants from seeds of the preceding generation (1946/7) grown with 60% soil humidity, were slightly inferior in yield to plants from seeds obtained in the preceding generation under 25% soil humidity conditions. The xeromorphism of this group of plants, acquired by them during 1946/7, was marked in 1948. But all the plants grown in 1948 with insufficient soil humidity (25%) produced a smaller crop and a lower yield of sugar compared with plants cultivated with 60% soil humidity.—R.P.J.

179 KAUDY, J. C. and others. **Borax applications to canning and sugar beets for the control of weeds.** *Agron. J.* 1952, **44,** No. 8, 409-11, bibl. 6.

An investigation into the use of boron as a weed-killer on crops of the boron-tolerant beet family was made in the beet-growing areas of Wisconsin from 1948-50. Applications of 40 lb. borax per ac., placed in a 4 in. band over the seed, gave effective control of weeds in both sugar-beet and red beet plots, without detriment to their yield.—W.J.B.

180 STAPEL, C. Om roeaal—en tiltagende fare for roeavlen. [**Beet eelworm—a growing danger to root crops.**] *Ugeskr. Landm.* 1952, **97,** 151-2, bibl. 4. [Stat. Plantepat. Forsøg, Lyngby, Denmark]

A review is given of the beet eelworm (*Heterodera schachtii*) position in Denmark, with particular reference to the effect of soil type and the association of beet crops and rape in the rotation on the prevalence of eelworm. Reference is made to Swedish work carried out in 1951 in which linseed, mustard, rape, poppy and barley, grown on eelworm-infested soil, were each followed by rye and, in the third year, by sugar-beet to determine the effect of the first-year's crop on sugar-beet yields. The yields following rape were much lower than those following the other crops, while yields following linseed and barley were almost normal. It is considered that, though these trials were carried out on heavy soils, and not on light, sandy soils on which other American and Swedish trials have shown that beet crops should not be grown more frequently than every 4th year, the possibility of using such crops as cereals and linseed to reduce the period between successive beet crops should be investigated under Danish conditions. For the present, it is recommended that crops such as beet, turnips and rape should not be grown successively at less than 4-year intervals and that here beet and rape crops are grown successively, eet should precede rape, not *vice versa*, on eel-orm-infested soils.—P.J.B.

81 HIJNER, J. A. De gevoeligheid van wilde bieten voor het bietencystenaaltje (*Heterodera schachtii*). [**The susceptibility of wild beet species to beet eelworm (*Heterodera schachtii*).**] *Med. Inst. rat. Suikerprod.* 1951, **21,** 1-13, bibl. 9, English summary p. 11. [Inst. Rat. Suikerprod., Bergen-op-Zoom, Netherlands]

ot experiments were made on the susceptibility to yst formation by *Heterodera schachtii* of the roots f *Beta lomatogona*, *B. trigyna*, *B. maritima* from he Mediterranean and Atlantic coasts, *B. macro-arpa*, *B. atriplicifolia*, *B. procumbens*, *B. webbiana* nd *B. patellaris*. All species except *B. webbiana*, *. patellaris* and *B. procumbens* were susceptible to *. schachtii*, in terms of cyst formation, though the oot secretions of all species were equally effective promoting cyst hatching. In the case of *B. atellaris*, the eelworm penetrated the roots, but id not appear to develop subsequently. In field rials, *B. patellaris* was used to control *H. schachtii* severely infested soil by exhausting the number of nhatched cysts in the soil and eliminating the free ematodes by their destruction in the roots of the lants. *B. patellaris* was regarded as the most uitable species because of : (a) its rapid growth,) its high production of leaf, and (c) its high eed yield. *B. patellaris* was sown in May in rows cm. apart, on eelworm-infested soil. Growth p to mid-June was slow, but thereafter rapid. y 10 October, the living content of eelworm ysts present in the soil, was reduced by approxi-ately 90%, compared with that on 1 May. Where *. patellaris* was sown on 25 July, the reduction in e living content of the cysts was approximately % by 10 October. In a second trial, *B. patellaris* lants were transplanted in rows 30 cm. apart and 5 cm. between plants in the row on 7 June and July, the plants being harvested for seed on 17 eptember and 1 October, respectively. In both ases, the living content of the cysts was reduced y approximately 62%. Where lucerne was sown 1 May on severely infested soil, the reduction in e living content of the cysts from 5 April to 16 ctober was approximately 44%. From these sults it is apparent that *B. patellaris*, within 3 onths, effected a greater reduction in the living ntent of the cysts than did lucerne within 5 onths. It is considered that *B. patellaris* may be practical value in reducing the prevalence of *. schachtii* in soils and also of value as a green-anure crop by virtue of its heavy production of liage, though the crop is not regarded as having ny other agricultural value. Trials will be rried out to study the effect on eelworm of *B. tellaris* sown under cover crops.—P.J.B.

182 KOCH, L. W. and HILDEBRAND, A. A. **An occurrence of a gummosis of sugar beets in Ontario in 1951.** *Plant Dis. Reptr* 1952, **36,** No. 5, 196-7, illus. [Plant Path. Lab., Harrow, Ontario, Canada]

A note is given on the occurrence of gummosis in sugar-beet, caused by bacterial action on roots that have frozen and thawed between harvest and final delivery to the factory. Gummosis leads to serious difficulties in processing. There is some evidence that boron deficiency appears to act as a predisposing cause of gummosis.—P.J.B.

183 SCHULZE, W. and others. Über die Möglichkeit der Stecklingsbewurzelung von *Beta* -Rüben durch synthetische Wuchsstoffe. [**The possibility of using synthetic growth substances for the rooting of *Beta* stecklings.**] *Z. Acker- u. Pflbau* 1950, **92,** No. 2, 185-96, bibl. 14, illus. [Forsch. Landw., Braunschweig-Völkenrode, Germany]

An account is given of experiments which showed that rooting can be induced in whole fodder- and sugar-beet and also in stecklings by applying synthetic growth substances, as paste or in solution, to the epidermis or to any cut surfaces of hypocotyl and root. Root formation is preceded by callus formation, generally stronger when paste is used and weaker when solutions are used. Callus and root formation take place principally at places which have been contacted by the growth substance, but also in the vicinity of the treated spots, following the path of conduction in an acropetal direction. Root formation takes place in whole beets or in more or less large stecklings independent of the presence of the " root groove " or of part of it. New root formation is specially marked in contact with the vessels immediately below the epidermal layer. Development of shoots is at first poorer in the treated than in untreated material, to a degree varying with the growth-substance concentration, but once rooting has taken place the initial set-back is overtaken and greater vigour is exhibited by the treated material. There is at first less anthocyanin formation in the young shoots of the treated material, but later no difference in this respect can be seen between treated and untreated. In preliminary trials very good seed yield was obtained in the same year, even from small stecklings obtained from " head pieces". In conducting the experiments it was not found necessary to maintain hot-house conditions. The cut surfaces of stecklings must be dried before treatment. The best results were obtained from the use of β indole potassium acetate.—G.M.R.

184 SINJAGIN, I. I. and MOROZOVA, N. P. [**Development of sugar-beet in its second year under different durations of daylight.**]

[Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1952, **83,** No. 2, 321-4. [All-Union Sci. Res. Inst. Beet Husb., Butovo, Moscow Province]

The extension of sugar-beet sowings to the northern non-chernozem belt has raised the problem of organizing seed production in this region. As conditions in the non-chernozem belt differ from those of the principal zone of beet sowings, especially in regard to daylength, it has been necessary to study the relationship between the growth of the seeding plants (i.e. plants in their 2nd year) and the duration of daylight. In the authors' experiments some plants which had not advanced to the stage of producing ripened seed in October [1949] were transferred at the beginning of 1950 to culture vessels containing heavy, argillaceous, medium-podzolic soils from the Butovo region. The vessels were placed in a warm room [temperature not stated]; those of the 1950 experiments remained there until 27 Jan. [1951], and those of the 1951 experiments until 1 Dec. [1951]. An extension of natural daylength was achieved by the use of daylight lamps and other electric lamps. Shortening the daylength was effected by means of covers of thick cloth having a white upper surface and a black lower surface. In 1950 the test was carried out (with basic NPK) under: (1) normal daylength of the Moscow region; and (2) 8-hours daylight during 24 hr. periods. During 1951, in addition to the above, there were also included 3 more variants, namely, a set of plants under continuous daylight, a set under 12-hours daylight, and a set under 4-hours daylight. These 1951 tests were carried out with cultures in which PK and NPK were applied [amounts not stated]. In the 1950 experiment, the plants in group (1) began flowering about 20-24 June and ripened seed between 3-5 August. In group (2) the plants did not flower until 11-26 December and seed did not ripen until after the end of the experiment (end of January). In 8-hour daylight, only one of 8 experimental plants began flowering on 3 July, completed flowering on 11 July, and formed ripe seed at the beginning of October. The remainder of the plants in this variant (and also all the plants grown in 4-hours daylight) did not flower. Continuous illumination (as compared with natural daylength) did not materially affect the time required by the plants to pass through the different phases of development, but curtailing the duration of illumination to 12 hours greatly retarded the passing of these phases. Plants in this variant [12-hours daylight] as compared with plants grown in natural daylength, formed flowering stems 3-7 days later, were at the phase of mass flowering 9-10 days later, and formed ripe seeds 19-21 days later. In short-day conditions (4-8 hr.) most of the plants formed flowering stalks with not a very great lag in time compared with those grown in natural daylength. The further development of these plants, however, was retarded, although growth of the flowering stalk and the increase in the number of rosette- and stalked-leaves progressed actively. This absence of budding and flowering in beet grown in short-day conditions indicates that during the experimental period the plants did not complete the light stage of their development. It is concluded, therefore, that the formation of non-flowering stalks in beet may progress to the end of the light stage only if the plants have already passed the vernalization stage. Part of the experimental plants, grown in short-day conditions, were transferred after 72 days of the tests to continuous light. A direct consequence of this was a sharp acceleration of development. In a month the plants formed buds and quickly flowered. It is well known that the length of the vernalization stage in sugar-beet populations varies. This variation, judging by the above results, may be due to the length of the light stage. In daylight of 8 hours' duration plants which have formed ripened seeds may be found along with plants which have not completely formed flowering stalks. Growing the plants under different lengths of daylight may thus be used as a method for analysing beet varieties (according to the length of their light stage). Such analysis may be important in selection work aimed at producing forms with the shortest light stage, thus facilitating the production of ripe seed soon in the 2nd year. Increasing N nutrition in these tests [details not supplied] had little effect on rate of plant development, although it greatly increased yields. In general, a small lag in passing a phase results from increasing N nutrition.—M.H.

185 FULTS, J. L. and others. **Glutamic acid in sugar beets increased by zinc dimethyldithiocarbamate.** *Bot. Gaz.* 1951, **113,** 207-10, bibl. 9. [Colorado Agric. Exp. Sta.]

The effects of two foliage-spray applications of zinc dimethyldithiocarbamate (Zerlate) [at 7.86, 3.93, and 1.97 lb. per acre] and 2,3-dimethylphenoxychloroacetic acid [at 0.4, 0.2 and 0.1 lb. per acre] on root yield, sucrose, and glutamic acid content of sugar-beets were studied in a replicated experiment. An apparent increase in actual mean glutamic acid percentage of harvested roots resulted from treatment by either chemical at all three rates used. Differences in the case of 2,3-dimethylphenoxychloroacetic acid were not considered significant. The difference between the control value and the mean for the medium and high rates of treatment with zinc dimethyldithiocarbamate was approximately equivalent to the 5% level of significance. No significant effects of treatment were observed for root yield, sucrose percentage, or gross yield of sucrose.—From authors' summary.

TURNIP

186 ENGLAND and WALES. Ministry of Agriculture and Fisheries. Adv. Leafl. 18. **Cabbage root fly.** 1952, pp. 5, illus.

Information is given on the control of the cabbage root fly (*Erioischia brassicae*) in swedes and turnips. Infested plants should be pulled up and destroyed. Applications of 4% calomel dust at 1 lb. per 60 row-yards is effective in controlling infestation when the plants have reached the second or third rough-leaf stage.—K.L.

POTATO

187 VUREN, J. P. J. van. **Potato cultivation.** *Fmg in S. Afr.* 1952, **27,** No. 316, 355-7. [Div. Soil Conserv. and Ext., Pretoria]

This is a general account of potato cultivation for S. African farmers. Particular attention is given to the prevention and control of the diseases and insect pests of the potato.—K.L.

188 JACOB, W. C. and RUSSELL, M. B. **The effect of tillage practices on the yield of Irish Cobbler potatoes.** *Amer. Potato J.* 1952, **29,** No. 6, 136-41, bibl. 1. [Cornell Univ., Ithaca, N.Y.]

189 TAMM, E. Über Beziehungen zwischen Witterungsverlauf und Ertragsleistung bei landwirtschaftlichen Kulturpflanzen im Land Brandenburg. 3. Beitrag : Hackfrüchte. [**Relations between the weather and the productivity of crop plants in Brandenburg. 3. Roots.**] *Z. Acker-u. Pflbau* 1950, **92,** No. 4, 450-65. [Inst. Acker- u. Pflbau, Berlin-Dahlem]

Yield statistics and weather records for the period 1922-1943 were studied, with special reference to he 2 years in which the highest yield of each of the rops investigated were obtained. Deviations in hese years from the annual mean of the 5 climatic actors : air temperature, soil temperature, preipitation, evaporation, and duration of sunshine re studied by means of a system of marking and ndices [which is explained in *Z. Acker- u. Pflbau* 2, No. 2, pp. 100-24]. (A fuller explanation s to be published in brochure form.) These deiations enable an estimate to be made of the limatic requirements of individual crops in order o attain optimal performance, and the estimates re summarized for late potatoes on p. 458, for arly potatoes on p. 461, and for fodder- and sugareet on p. 465.—G.M.R.

90 NORTHERN IRELAND. Monthly Report of the Ministry of Agriculture. **Results of potato variety trials.** *Mon. Rep. Minist. Agric. N. Ire.* 1952, **26,** No. 10, 297-301.

The object of these trials, which were carried out at Stormont and at various centres in Northern Ireland, was to compare the cropping capabilities, tuber characteristics and suitability of some newer varieties of potatoes with some of the older, well-known varieties. The following were the most promising, recently introduced, potato varieties tested at Stormont during 1951. First early : Ulster Prince, Ulster Premier. Second early : Ulster Ensign, Ulster Emblem, Ulster Dale. Main crop : Ulster Supreme, Ulster Leader. In six years' trials at various centres in Northern Ireland, Stormont Dawn gave the highest yields at 23 of the 71 centres. Arran Pilot gave the highest yields at 22 centres while the new variety Ulster Supreme gave the highest yields at 4 centres during 1950-1. The other new variety tested, Ulster Leader, gave low average yields in the two seasons 1950 and 1951.—K.L.

191 AMERICAN POTATO JOURNAL. **New potato varieties released.** *Amer. Potato J.* 1951, **28,** No. 8, 697-9.

The pedigrees, the descriptions of the plants and tubers, and the pathological characteristics of the varieties Canso and Keswick are given. Under New Brunswick conditions, Canso equalled Katahdin, and Keswick equalled Green Mountain, in yield.—E.B.O.

192 BOOCK, O. J. Variedade de batatinha "Eigenheimer" (*Solanum tuberosum* L.). [**The Eigenheimer potato variety.**] *Bragantia* 1950, **10,** No. 12, 371-82, bibl. 14, illus., English summary p. 381. [Received 1952] [Inst. Agron., Campinas, São Paulo, Brazil]

An account is given of the behaviour of the Netherlands potato variety Eigenheimer under the soil and climatic conditions of potato-growing areas in São Paulo.—G.M.R.

193 BOOCK, O. J. and NETO, J. E. P. Produtividade e composição mineral de diferentes variedades de batatinha. [**Productivity and mineral composition of different potato varieties.**] *Bragantia* 1950, **10,** No. 6, 161-76, bibl. 10, English summary p. 175. [Received 1952] [Inst. Agron. Campinas, São Paulo, Brazil]

Ten potato varieties from the Netherlands grown in 6 localities of the State of São Paulo were studied for yield, earliness, disease- and pest-resistance and mineral composition. Results are presented. Chemical analysis showed that the skin of the tuber has a higher water content and is richer in magnesium, calcium and potassium than the flesh. Phosphorus is found in equal amounts in skin and flesh. The content of the above-mentioned elements was not significantly different in the varieties studied.—G.M.R.

194 Couto, F. A. A. Introdução de novas variedades da batatinha (*Solanum tuberosum* L.) da Holanda para Minas Gerais. [**Introduction of new potato varieties from the Netherlands into the State of Minas Gerais, Brazil.**] *Ceres, Minas Gerais* 1951, **8,** 395-405, bibl. 5, illus., English summary pp. 404-5. [Agric. Coll., Minas Gerais, Brazil]

An account is given of potato variety trials held in 5 localities. Of the 22 Netherlands varieties tested, Lomman proved the best under the conditions of Minas Gerais.—G.M.R.

195 McIntosh, T. P. **Healthy seed potatoes. Recent developments in Scotland.** *Scot. Agric.* 1952, **31,** 99-104. [Dep. Agric., Scot.]

The methods used in building up healthy stocks of seed potatoes in Scotland include Certification Schemes and roguing, the use of apparently healthy plants, and the use of virus-tested plants.—K.L.

196 Gfroerer, E. Die Pflanzkartoffelvermehrung in Württemberg und Hohenzollern. [**Production of seed potatoes in Württemberg and Hohenzollern.**] *Z. Acker- u. Pflbau* 1950, **92,** No. 4, 498-524, bibl. 32. [Landw. Hochsch. Hohenheim, Germany]

A survey is presented of climatic and soil conditions and of seed potato production, past and present, in the regions named, with consideration of possible extension and improvement in the future.—G.M.R.

197 Kapoor, S. L. **Importance of manuring in potato crop raised from cut pieces.** *Proc. Indian Acad. Sci.* 1952, **34,** No. 2, 99-108, bibl. 8. [Sect. Agron., Coll. Agric., Benares Hindu Univ.]

Experiments were carried out at Benares Hindu University in 1945-6 and 1947-8 to estimate the effect of manuring on the yield from potato seed-pieces using the variety Darjeeling Red Round. The manures consisted of farmyard manure and sulphate of ammonia. A high level of manuring gave a higher yield, a larger number and a bigger size of potatoes than a low level of manuring. The yield from different sizes of seed-piece was affected by the level of manuring, the difference in yield between the quarter seed-piece and the whole sett being very small under heavy manuring. It is concluded that seed can be economized by using small setts, whole or cut, provided that heavy manuring is practiced.—C.L.S.

198 Sanford, G. B. **Effect of various chemicals on the natural healing of freshly cut potato sets.** *Phytopathology* 1951, **41,** 1077-82, bibl. 7. [Dom. Plant Path. Lab., Edmonton, Alberta]

Studies were made of the rate of suberization of intact cells on the cut surface and wound periderm formation in freshly-cut potato setts buried in soil at a temperature of 61°F., following immersion in a number of different chemicals, including Spergon, Fermate, Semesan Bel, mercuric chloride, Ceresan, sulphur and calcium hydrate. Compared with untreated controls, only Spergon and calcium hydrate stimulated natural healing in the setts as indicated 3 days after treatment. Ceresan seriously retarded natural healing, while all the other chemicals to a greater or lesser extent delayed healing, compared with the controls. The rate of healing was much slower at a temperature of 61 than at 78°F. From the results it is suggested that the present practice in Canada of disinfecting whole tubers be discontinued and that Spergon constitutes an effective disinfectant for cut setts. The Spergon used in these trials was in the form of a 1% solution.—P.J.B.

199 Claver, F. K. Influencia de luz, oscuridad y temperatura sobre la incubación de la papa. [**Influence of light, darkness and temperature on the incubation of the potato.**] *Phyton* 1951, **1,** 3-12, bibl. 3, English summary p. 3. [Fac. Agron., Univ. La Plata, Argent.]

Experiments were conducted under artificial conditions to test the effects of light, darkness and temperature upon the incubation (period elapsing between the sprouting of the tuber and tuber formation) of the Katahdin potato variety. It was concluded that light is not necessary for incubation. A period of 17 natural cycles of light and darkness (photoperiod of 10 hours) accelerates the process. With longer periods (31 to 41 days) the accelerating effect tends to disappear. Continuous light (92 days) greatly prolongs incubation. The most favourable temperatures seem to lie between 15.2 and 18.7°C. Higher (19.4 to 21.2°C.) and lower (5.6 to 9.5°C.) temperatures prolong the incubation period.—Author's summary.

200 Hemberg, T. **The significance of the acid growth-inhibiting substances for the rest-period of the potato tuber.** *Physiol. Plant.* 1952, **5,** 115-29, bibl. 14. [Plant Physiol. Inst., Stockh. Univ., Sweden]

Studies were made of the content of neutral and acid growth-inhibiting substances and auxin in the peelings of dormant potatoes and the effect of ethylene chlorhydrin on the acid growth-inhibiting substances. The varieties used were Eigenheimer, Ackersegen, Magnum Bonum and Birgitta, with respective dormant periods, at a temperature of 5°C., of 4, 7, 10 and 14 weeks. The neutral growth-inhibiting substances were found to be of little significance to the dormant period and did not disappear at its end, while the acid growth-inhibiting substances disappeared at the end of the lormant period in the case of each variety. These acid growth-inhibiting substances, therefore, were regarded as of importance as regulators of the dormant period of potatoes. The use of ethylene chlorhydrin to interrupt the dormant period led to the disappearance of acid growth-inhibiting substances in the peelings, this effect being apparent within 3 days of treatment. There was no apparent relation between the auxin content of the peelings and the length of the dormant period of given varieties.—P.J.B.

201 CAVIA, C. E. Influencia de subregiones de la regiо́n de Rosario sobre papa Katahdin para semilla. [**Influence of subregions of the Rosario region upon Katahdin seed potato.**] *Bol. Prod. Fom. agric.* 1951, **3,** No. 30, 22-6. [Minist. Agric. Argent.]

Katahdin seed tubers from the region of Rosario (31.43°S. and 62.25°W.) having given equal or better yields than local, normally harvested tubers in the south-east of Buenos Aires Province (see Abs. 232), trials of tubers from 3 sub-divisions of the Rosario region were made in 1945-6 and 1946-7 at the Balcarce Experiment Station, south-eastern B.A. Tabulated information on sprouting (number of plants per plot), incidence of leaf roll disease, and yield shows that tendency to leaf roll, which is the principal disadvantage of Rosario-grown tubers, is lowest in those emanating from the vicinity of the river Paraná.—G.M.R.

202 VASUDEVA, R. S. and AZAD, R. N. **Efficacy of certain fungicides against potato late blight and assessment of loss due to the disease.** *Amer. Potato J.* 1952, **29,** No. 3, 61-71, bibl. 5, illus. [Mycol. and Plant Path. Div., Indian Agric. Res. Inst., New Delhi]

Trials were carried out in the hills of the Simla region, India, at about 9000 ft. a.s.l., in 1948-9, to test various fungicides against late blight, *Phytophthora infestans*, on potatoes. Results showed that Burgundy mixture and 0.25% Perenox gave very good control, the increase in the potato yield being, respectively, 139 and 71%. No absolute correlation between yield and the ultimate loss of leaf area destroyed by the disease was observed. There was, however, an indication that the yield decreases with the increase in the loss of leaf area and vice versa. It was also shown that yield is greatly influenced by the rate at which the disease progresses and the total period during which the foliage remains green as a result of protection provided by the fungicides.—E.B.O.

03 LARGE, E. C. **Trials of substitutes for sulphuric acid for potato haulm killing. 2. Blight in tubers.** *Plant Path.* 1952, **1,** 56-9, illus.

See *Fld Crop Abstr.* 5 : 1189.] The effect on blight in the tubers of the various treatments tested for potato haulm killing was studied at 11 centres in England and Wales in 1951. The effect on blight of protective dusting and spraying was also studied at some centres. Results showed that, under the conditions of the trials, there was no appreciable difference in the amount of blight in the tubers, at any of the centres, following mechanical haulm destruction, chemical haulm destruction, or "biological haulm destruction" resulting from leaving the haulm to be killed by blight itself. The sole value of haulm destruction (which is a measure intended to prevent blight in tubers) in 1951 was in facilitating lifting. It is thought that very different results may be obtained in other years under different weather conditions.—E.B.O.

204 BLACK, W. **Recent research in potato breeding for blight resistance.** *Brit. agric. Bull.* 1952, **5,** No. 19, 15-18, illus. [Scot. Plant Breed. Sta.]

205 HOOKER, W. J. and SHERF, A. F. **Scab susceptibility and injury of potato tubers by 2,4,5-trichlorophenoxyacetates.** *Amer. Potato J.* 1951, **28,** No. 8, 675-81, bibl. 2, illus. [Iowa Agric. Exp. Sta., Ames]

It was confirmed that the injury of tubers, following treatment of potato haulms with 2,4,5-trichlorophenoxyacetates, consists of severe erosion and pitting. However, in the experiments described, chemical injury was distinguishable from that caused by *Streptomyces scabies*. When scab inoculum was present, injury was prevalent in both field and greenhouse tests on all varieties regardless of inherent resistance to scab. In sterile sand, in the absence of the scab pathogen, tuber injury developed regardless of variety. In the field, in the presence of abundant *S. scabies* inoculum, treatment with 2,4,5-T generally decreased the amount of typical scab on the varieties under test. In most cases the number of severely scabbed tubers was less and the number of scab-free tubers was greater in plots receiving 2 applications of the chemical than in the plots sprayed only once or not at all. Tuber injury from 2,4,5-T was similar on all varieties.—From authors' discussion.

206 ELLISON, J. H. and others. **Effect of soil reaction on the performance of certain scab-resistant and susceptible potato varieties.** *Amer. Potato J.* 1951, **28,** No. 9, 721-7, bibl. 3, illus. [Cornell Univ., Ithaca, N.Y.]

Results are given of 4 years' trials in which scab-resistant and scab-susceptible potato varieties were grown on permanent plots ranging in pH value from 4.3 to 7.6. Green Mountain, Irish Cobbler, Katahdin and Mohawk showed approximately the same susceptibility to scab, producing the highest yields of scab-free tubers between pH 4.3 and 5.2, and yielding progressively less clean tubers as the pH increased. Ontario proved to be highly resistant to scab infection during all 4 years over the entire pH range tested. Yampa, tested in 1950 only, proved to be resistant to scab infection over the whole pH range of 4.3 to 7.6 and yielded well at all pH levels, except 7.6, at which point its yield declined significantly.—From authors' summary.

207 MONTALDO, A. Fitomejoramiento para resistencia a la nematosis de la papa. [**Selection of potatoes for resistance to eelworm disease.**] *Agric. tec., Chile* 1951, **11,** 64-85, bibl. 25, illus., English summary pp. 83-4. [Dep. Invest. Agric., Minist. Agric.]

Eelworm disease of potatoes, caused by *Heterodera marioni*, is serious in central and southern Chile. The best method of control is to select resistant potato varieties. Results are given in detail of trials, carried out between 1946-51, in which 896 imported and Chilean potato varieties and seedlings were tested for resistance to the nematode on heavily infested soil. The susceptible variety Corahila larga was used as a control. From the whole, 17 varieties and seedlings were selected as resistant. It is thought, however, that a great part of this material may not possess real resistance, its apparent immunity being the result of failure to transmit the infection; many of these 17 varieties may be eliminated in further trials. The Royal Kidney variety and the seedling C77-1 proved constantly resistant during the 5-year period. The President variety showed resistance in 3 years out of 4. Four Centinela seedlings, i.e., C96-1, C102-5, C110-50 and C182-65, and the USDA seedling 627-164 showed resistance for 3 years out of 3. The European varieties Bintje and King Flat and the seedling C103-3 showed resistance for 2 years out of 2.—E.B.O.

208 VAN DEN BRANDE, J. and others. Chemische bestrijding van het aardappelcystenaaltje, *Heterodera rostochiensis* Woll. [**Chemical control of the potato eelworm, *Heterodera rostochiensis* Woll.**] *Meded. Landb-Hoogesch. Gent.* 1951, **16,** 247-59, bibl. 25, English summary p. 257.

The results are given of one year's work on the control of potato eelworm in Belgium. The use of calcium cyanamide and ammonium sulphate at rates of up to 2000 kg. per ha. were ineffective. In trials with a number of soil fumigants, only DD mixture gave good results, with high potato yields and an 80% kill of eelworms. Ethylene dibromide was extremely phytotoxic, even where the potatoes were sown 5 months after applying this fumigant. The use of DD mixture in eelworm- free soil did not appear to stimulate potato growth; ethylene dibromide under similar conditions considerably retarded potato growth.—From authors' summary.

209 MAI, W. F. and PETERSON, L. C. **Resistance of *Solanum ballsii* and *Solanum sucrense* to the golden nematode, *Heterodera rostochiensis* Wollenweber.** *Science* 1952, **116,** No. 3009, 224-5, bibl. 4. [Plant Path. Dep., Cornell Univ., Ithaca, N.Y.]

Both *S. ballsii* and *S. sucrense* showed consistently low susceptibility to *H. rostochiensis*. *S. ballsii* could not be crossed with commercial potato varieties or induced to set seed by selfing. *S. sucrense* could be crossed with commercial varieties and inbred seedlings of this species showed considerable variation in susceptibility to *H. rostochiensis*.—P.J.B.

210 RICHARDSON, L. T. and RACICOT, H. N. **The comparative efficiency of tuber indexing and tuber unit planting in the elimination of virus diseases from seed potatoes.** *Amer. Potato J.* 1951, **28,** No. 11, 765-75, bibl. 15, illus. [Bot. and Plant Path. Div. Sci. Serv., Dep. Agric., Ottawa, Canada]

Under the conditions of the trials conducted at Ottawa during 1944-8, there was no marked difference between the tuber index and the tuber unit planting methods as regards their degree of accuracy in detecting virus diseases in seed potatoes. Both methods can be employed for maximum efficiency in eliminating virus diseases. It is stated, however, that the tuber index method has sufficient advantage over the tuber unit method, for maintaining the purity of seed-potato stock, to warrant the additional cost and labour involved, especially in areas where the vectors of potato viruses are prevalent.—E.B.O.

211 WIANT, J. S. and others. **Effect of temperature on black spot in Long Island and Red River Valley potatoes.** *Amer. Potato J.* 1951, **28,** No. 11, 753-65, bibl. 4, illus. [US Dep. Agric., Bur. Plant Industr., Soils and Agric. Engng]

An account is given of preliminary investigations on the effect of temperature on black spot in stored potatoes of the Green Mountain variety, grown near Riverhead, Long Island, during 1944-9, and of the Triumph and Irish Cobbler varieties, grown near East Grand Forks, Minnesota, in 1949. Results showed that the prevalence and severity of black spot could be reduced to a great extent by conditioning the susceptible potatoes for some days at temperatures higher than a normal storage range (prior to bruising). A conditioning temperature range of approximately 50 to 55°F. was found quite effective, but better results were obtained at temperatures from 65 to 75°F. Complete control was not obtained even with the highest temperature employed. The results with the Green Mountain potatoes indicated that the length of the conditioning period should be at least 2 or 3 days and preferably about 1 week.—E.B.O.

212 MASSEY, P. H. and others. **Varietal susceptibility of potatoes to internal black spot.** *Amer. Potato J.* 1952, **29,** No. 6, 127-35, bibl. 14, illus. [Cornell Univ., Ithaca, N.Y.]

Trials were carried out in 1949-50 to study the relationship between the specific gravity of potatoes and their susceptibility to internal blackening. Other trials were carried out in 1949-51 to study the susceptibility of several potato varieties to black spot when grown in different counties of New York State. The following results were obtained: (a) a highly significant positive correlation was found between black spot index and specific gravity using Long Island-grown Katahdin potatoes; (b) the variety trials indicated that internal black spot is no longer just a Long Island problem, but is becoming increasingly prevalent throughout New York State; and (c) although several of the varieties tested reacted differently in blackening susceptibility when grown in certain counties, the Ontario variety consistently blackened more than the other varieties in practically every location, whereas Ashworth, Pontiac and Kennebec showed the least susceptibility to discoloration of any of the varieties tested. The most practical recommendations for the control of internal black spot are: (a) careful handling of the potatoes to avoid bruising, especially after very long storage, and (b) the use of less susceptible potato varieties.—E.B.O.

213 HUTTON, E. M. and PEAK, A. R. **The selection of spotted-wilt-resistant phenotypes in the potato (*Solanum tuberosum*).** *Aust. J. agric. Res.* 1952, **3,** No. 2, 137-47, bibl. 7, illus. [CSIRO, Canberra]

214 HOYMAN, W. G. **Relation of water supply to xylem discoloration of potato tubers caused by vine killing.** *Amer. Potato J.* 1952, **29,** No. 5, 113-22, bibl. 27, illus. [Fargo, North Dakota]

Trials were carried out during 1947-51 to study the relationship of water supply to potato tuber discoloration caused by haulm killing. Triumph potatoes were grown on a plot under the following conditions: (a) with natural rainfall; (b) with natural rainfall plus irrigation; (c) on raised soil with natural rainfall; and (d) in one year, on raised soil with natural rainfall, but with the soil covered with roofing paper. The results showed that tuber discoloration is related to the amount of water received by the plant previous to haulm killing and to time of killing. The treatment giving the most discoloration was raising the soil and covering it with roofing paper, followed by raising the soil, but leaving it uncovered. In the normally treated rows (with natural rainfall), there was a lower amount of discoloration in the years of normal or high rainfall in August than in the years of low rainfall in August, with the exception of 1948 when the expected tuber discoloration was not obtained. The lowest percentage of discoloration was obtained in tubers harvested from the irrigated rows. In most instances, early haulm killing caused a greater amount of discoloration than late killing.—E.B.O.

215 MACLACHLAN, D. S. and RICHARDSON, L. T. **The rapidity of vine-killing by herbicides in relation to internal tuber discoloration in potatoes.** *Amer. Potato J.* 1951, **28,** No. 8, 687-9. [Bot. and Plant Path. Div., Dep. Agric., Ottawa, Canada]

Field trials carried out during 1947-50 showed that: (a) Dowspray 66 Improved killed potato haulms more rapidly than did Sinox General or Handy Killer (on an average, in 5, 6 and 7.6 days, respectively); (b) the stage of maturity did not influence the rate of kill with Dowspray 66, but more mature plants were killed more rapidly by Sinox General and Handy Killer; (c) the incidence of internal discoloration of the tubers varied inversely with the number of days required to kill the plants, but there was a marked reduction in the amount of discoloration after 4 months of storage.—E.B.O.

216 TIZIO, R. Efecto de las altas temperaturas como factor de generación de la papa. [**High temperatures as a factor in potato degeneration.**] *Phyton* 1951, **1,** 69-89, bibl. 27, English summary, pp. 69-70. [Fac. Agron., Univ. La Plata, Argent.]

Two groups, each of 200 tubers, were exposed respectively to low (average 7.3°C.) and high (average 25°C.) temperatures for 45 days, during which period the sprouts grew uniformly, equal size and vigour being exhibited in both environments. The tubers were then planted under uniform conditions and the cultures were examined for virus disease (from which they were free) while records were kept of height, vigour, and flowering, in which no difference between the two groups was observed. There was, however, a significant difference in yield, which was 32.2% higher in the low temperature than in the high temperature group. The number of tubers, also, was 41.7% greater in the low temperature group. Results thus disprove the theory which ascribes degeneration to the successive elimination of sprouts during storage, and show that, for the Katahdin variety, an average temperature of 25°C. acting for 45 days upon the sprouted seed tubers is sufficient to produce the observed degree of degeneration in virus-free plants.—G.M.R.

217 SIGLE, K. Das Kartoffeleiweiss, seine Steigerung und Verwertung. [**Potato protein, its increase and evaluation.**] *Z. Acker- u. Pflbau* 1951, **93,** No. 2, 208-58, bibl. 132. [Landw. Hochsch., Hohenheim, Germany]

On the basis of his own findings and those recorded in the literature, the author studies successively the protein content of the potato tuber and the composition of the N-substances ; the distribution of the N-substances in the tuber ; protein content and size of tuber ; the behaviour of the N-substances during the growing season ; protein content in relation to locality, manuring, disease, storage, and taste respectively ; the value of potato protein for human and animal consumption ; the fate of the N-compounds in processing and cooking ; and protein content in relation to breeding. The breeding of a type with high starch- and protein-content appears to be quite possible and several (named) varieties already approach this objective.—G.M.R.

218 MIKULJSKIĬ, A. A. [**A change in the content of dry matter, carbohydrates and nitrogenous substances in the leaves and the tubers of the potato during ripening.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR.*) 1952, **82,** 789-92, bibl. 10. [Bot. Gdn Acad. Sci. USSR]

The investigation was conducted with the potato variety Voljtman 1177. The ripening of the tubers of the potato is characterized by an increase in the content of dry matter, starch and total N, and by an increase in the ratio soluble N to protein N and a decrease in the ratio sucrose to reducing sugars.—R.P.J.

219 PAYNE, Merle G. and others. **The effect of 2,4-D treatment on free amino acids in potato tubers.** *Amer. Potato J.* 1952, **29,** No. 6, 142-50, bibl. 26, illus. [Colorado Agric. Exp. Sta., Fort Collins]

220 ŠEBÁNEK, J. O stimulaci bramboru a slunečnice kyselionou 2,3,5-triiodobenzoic ovou. **On the stimulation of potato and sunflower with 2,3,5-triiodobenzoic acid.** *Sborn. čsl. Akad. Zeměd.* (*Ann. Acad. czl. Agric.*) 1952, **25,** 101-16, bibl. 38, English summary p. 116.

2, 3, 5-triiodobenzoic acid (TIBA) applied to the sprouts or buds of potato tubers (*Solanum tuberosum*) in the form of lanolin pastes enhanced the branching of the sprouts, and partly of the stolons and tubers, proportionately to the concentration of the pastes. Also tuber production was considerably stimulated. In the sunflower (*Helianthus annuus*) the length of the main axis, the number of the leaves and of side branches, the time of flowering and ripening of the seeds depended directly upon the concentration of TIBA pastes smeared on the young stems of the plant. The development of flowers was accelerated by 14 days. The optimum concentration for encouraging green mass yield was 0.12%.—From author's summary.

221 BOOCK, O. J. and CASTRO, J. B. de. Efeito do nitrogênio, fósforo e potássio na adubação da batatinha (*Solanum tuberosum* L.). [**Effect of nitrogen, phosphorus and potassium in the manuring of the potato.**] *Bragantia* 1950, **10,** No. 8, 221-33, bibl. 23, illus., English summary p. 232. [Inst. Agron., Campinas, São Paulo, Brazil]

222 BOOCK, O. J. O farelo de torta de algodão na adubação da batatinha. [**Cotton-seed meal in the manuring of potatoes.**] *Bragantia* 1950, **10,** No. 11, 329-33, bibl. 5, English summary p. 333. [Received 1952] [Inst. Agron., Campinas, São Paulo, Brazil]

Six trials carried out in 5 localities of the State of São Paulo showed that cotton-seed meal can be used to advantage as a fertilizer for *Solanum tuberosum*, preferably in a mixture with ammonium sulphate, at the rate of 650 kg. cotton-seed meal per hectare.—From author's summary.

223 EDGAR, A. D. **Determining the specific gravity of individual potatoes.** *Amer. Potato J.* 1951, **28,** No. 10, 729-31, bibl. 1, illus. [Bur. Plant Industr., Soils, and Agric. Engng, US Dep. Agric. East Grand Forks, Minn.]

The method of determining the specific gravity of individual tubers by means of a specific gravity potato grader is described.—E.B.O.

224 KUNKEL, R. and others. **Mechanical separation of potatoes into specific gravity groups shows promise for the potato chip industry.** *Amer. Potato J.* 1951, **28,** No. 8, 690-6, bibl. 15. [Colorado Agric. and Mech. Coll., Fort Collins]

The results of a trial, in which potato tubers of the variety Russet Rural were divided in 2 specific gravity groups (above and below specific gravity 1.0841), confirmed the desirability of high specific gravity potatoes for chipping.—E.B.O.

225 WAGER, H. G. and others. **The storage of ware potatoes in permanent buildings. 1, Storage in bins in an uninsulated store. 1946-7.** *J. agric. Sci.* 1952, **42,** No. 3, 266-75, bibl. 3, illus. [Ditton Lab., DSIR]

Potatoes of the variety Majestic were stored in wooden bins in an uninsulated shed. The temperature of the potatoes was recorded by some 60 thermocouples distributed throughout the bins. The resistance to air flow of the stack of potatoes was measured on two occasions ; before sprouting had begun, and when the tubers were well sprouted. The average temperature of the bins was found to follow the general trends in average air temperature, but reflected rapid changes of air temperature on a very reduced scale. The outer layer of potatoes differed little from the mean temperature of the store and changed in temperature relatively rapidly. The centre of the stack of potatoes, on the other hand, was warmer than the store air and changed in temperature very slowly. The average temperature of the potatoes was always above that of the air, except when the potato temperatures lagged behind rising air temperatures. With a fairly steady air temperature of 44.6°F. the average potato temperature in an unventilated bin was 50°F. and the average temperature at the hottest point was 55°F. As the temperature rises the generation of metabolic heat increases and the difference between the store air and both the average and the maximum temperature of the potatoes might be expected to increase. The season's work clearly showed the effectiveness of using night air to cool the stacks. With night ventilation the mean temperature could be maintained at or below the mean air temperature and the temperature variation within the bin was greatly reduced. This method of cooling, though valuable, is limited by the night minimum temperatures and in the U.K. is not likely to control the temperature at or below that at which sprouting will freely occur. Storage from October to March resulted in a loss of about 5% of the weight of the potatoes put in, the bulk of the loss being physiological (evaporation and respiration). During April and May the loss in weight was much more rapid and by the beginning of June an additional physiological loss in weight of 5–7% had occurred as well as the growth of 5% by weight of sprouts.—From authors' summary.

226 SMITH, W. L. **Effect of storage temperatures, injury and exposure on weight loss and surface discoloration of new potatoes.** *Amer. Potato J.* 1952, **29,** No. 3, 55-61, bibl. 10. [Bur. Plant Industr. Soils and Agric. Engng, US Dep. Agric., Beltsville, Md]

Potatoes stored at a constant temperature of 0°F. for 2 weeks showed less surface browning than those stored initially (first week after treatment) at 40° or 50° and then shifted to 70°F. Potatoes stored at 70°F., after an initial storage period at 50°, showed less weight loss and less surface browning than those stored initially at 0°. Tubers stored initially at 40°F. lost weight more rapidly after they were shifted to 70° than tubers stored constantly at 70°. Initial storage at 0°F. was decidedly detrimental to the general appearance of new potatoes.—Author's summary.

227 DENMARK. Statens Forsøgsvirksomhed i Plantekultur. Beret. 454. Opbevaringsforsøg med kartofler 1946-1950. [**Storage trials with potatoes, 1946-1950.**] *Tidsskr. Planteavl* 1952, **55,** 302-26.

The results are given of studies on the temperature and CO_2 content of the air in potato clamps and storage houses ventilated in different ways. The method of ventilation did not appear to have much effect on storage losses in potatoes stored from October to March. Storage losses varied from 2.5 to 2.8% in fresh weight and 6.0 to 6.2% in dry matter in clamps and from 4.6 to 7.2% in fresh weight and 5.7 to 7.0% in dry matter in storage houses.—P.J.B.

228 WHITTENBERGER, R. T. **Changes in specific gravity, starch content, and sloughing of potatoes during storage.** *Amer. Potato J.* 1951, **28,** No. 10, 738-47, bibl. 9. [E. Reg. Res. Lab., Philadelphia, Pa.]

There are limitations to the specific gravity method for predetermining the sloughing loss of potatoes, as the extent of sloughing may vary in storage without any change in specific gravity or it may even decrease as specific gravity increases. The accuracy of the specific gravity method for indicating starch content may also vary with the storage of tubers. An hypothesis concerning the general nature of potato texture and the mechanism of change in texture is presented.—From author's summary.

229 BURTON, W. G. **Studies on the dormancy and sprouting of potatoes. 3. The effect upon sprouting of volatile metabolic products other than carbon dioxide.** *New Phytol.* 1952, **51,** No. 2, 154-62, bibl. 18.

During storage, potato tubers evolve volatile substances which will suppress their own sprouting. It is suggested that these substances may include both ethylene and the vapour of *n*-amyl alcohol, both of which will suppress sprouting, and that the depression of sprouting previously ascribed to carbon dioxide may be due in fact to these other volatile substances.—Author's summary.

230 EMILSSON, B. and others. Användning av groningshämmande medel vid lagring av matpotatis. II. Försök under lagringssäsongerna 1949-50 och 1950-51. [**The use of sprout-inhibiting chemicals in the storage of ware potatoes. II. Experiments during the storage seasons 1949-50 and 1950-51.**] *K. LantbrAkad. Tidskr., Stockh.* 1951, **90,** 421-49, bibl. 9. [Inst. Växtforskn. Kyllagring, Nynäshamn, Sweden]

In 8 series of trials in Sweden, of which 6 were carried out in storage houses and 2 in clamps, potatoes were stored following treatment with

2,3,5,6-tetrachloronitrobenzene (TCNB), α-naphthaleneacetic acid methyl ester (MENA), α-methylnaphthylmethylether, IPC and phenylurethan. In all cases, TCNB applied at a rate of 12 g. per 100 kg. of potatoes was highly efficient in inhibiting sprouting, both when applied during the autumn and during spring. Under favourable circumstances, applications of 3 to 6 g. per 100 kg. of potatoes also gave good results. MENA was considerably less effective than TCNB when applied in autumn, but of similar effectiveness when applied in spring. The use of 12 g. MENA per 100 kg. of potatoes was the minimum effective treatment when used in autumn, though this amount was not always effective. In general, treatment in spring with 9 to 12 g. MENA per 100 kg. potatoes was effective. It is considered possible that the lower storage temperatures, and the consequent lower volatility of MENA, in these Swedish trials was largely responsible for the greater applications found necessary to ensure sprout inhibition compared with those found necessary in trials in other countries where 1 to 3 g. MENA per 100 kg. potatoes has proved sufficient. Less complete trials were carried out with the remaining materials. The activity of α-methyl naphthylmethylether appeared to be similar to that of MENA, while phenylurethan was similar to TCNB. IPC was studied in only one trial, in which it completely inhibited shoot growth following applications as low as 1.3 g. per 100 kg. potatoes. None of the preparations used had any apparent effect on the cooking quality of the potatoes. The results are given of the sprout-inhibiting effect of TCNB on a number of potato varieties, including Bintje, Birgitta, Eigenheimer, President, King Edward and Sandnudel. TCNB was fully effective on varieties with a short dormant period, such as Bintje and Eigenheimer. Losses from rotted tubers in untreated samples averaged 3.42% for all varieties, compared with 2.62% for TCNB-treated samples; respective weight losses were 6.45 and 5.02%, the differences in both cases being highly significant. TCNB treatment caused a significant decrease in the tendency of potatoes to darken on cooking, compared with untreated controls. It was unnecessary to cover large lots of treated potatoes, in order to prevent dispersal of the TCNB; the superficial layers of potatoes acted as an efficient cover.—P.J.B.

231 KENNEDY, E. J. and SMITH, Ora. **Response of the potato to field application of maleic hydrazide.** *Amer. Potato J.* 1951, **28,** No. 9, 701-12, bibl. 6, illus. [Cornell Univ., Ithaca, N.Y.]

Three concentrations of maleic hydrazide, viz., 0.1, 0.01 and 0.001%, were applied to potato plants of the variety Sebago at 4 dates during the growing season and compared with untreated potatoes. 0.1% maleic hydrazide, applied about the time of initial tuber set, caused a large increase in the number of tubers formed, severe injury to forming tubers, curling and chlorosis of foliage and stunting of growth. Foliage and tuber injury decreased with later applications and with less concentrated applications of maleic hydrazide. 0.1% maleic hydrazide caused a reduction in weight loss of sprouts, also an increase in the number of eyes showing activity. In general, a high concentration of maleic hydrazide, applied early in the growing season, caused plant injury, but when applied late it resulted in a reduction in the amount of sprouting in storage.—From authors' summary.

232 CAVIA, C. E. and CARUSO, S. A. Conservación de semilla de papa variedad Katahdin en la región sudeste de la Pcia. de Buenos Aires. [**Conservation of Katahdin seed potato in the south-east of the Province of Buenos Aires.**] *Bol. Prod. Fom. agríc.* 1951, **3,** No. 30, 16-21, bibl. 2 in text. [Minist. Agric. Argent.]

Most of the potatoes grown in Argentina are of the Katahdin variety, and practically the only seed-producing area is in the south-east of the Province of Buenos Aires. The winter here is too short and not sufficiently cool for this variety with its short period of dormancy, so that unduly early sprouting with a consequent loss of weight (some 20%) and of turgescence result. Five methods of conserving turgescence in seed tubers were tested in parallel trials conducted in 3 localities of south-eastern Buenos Aires. Keeping the seed tubers in cold storage at a temperature of approximately 4°C. gave the best results in every respect (sprouting, uniformity and vigour of the cultures, and yield). Next, in spite of leaf roll, came the use of second-crop tubers grown in Rosario, which are harvested later than is normal in the south-east; and these were followed by the regional tubers harvested later than customary. The value of late harvesting was thus demonstrated, but the slightly greater yield resulting from a preliminary exposure of the seed tubers to light under cover of a shed is not considered worth the labour, space, and expense incurred.—G.M.R.

233 EDWARDS, P. W. and others. **Drying potatoes for feed in a direct-fired, rotary drier. Economic feasibility of the process.** *Amer. Potato J.* 1952, **29,** No. 5, 103-12, bibl. 5, illus. [E. Reg. Res. Lab., US Dep. Agric., Philadelphia, Pa.]

234 SMITH, Ora. **Potato quality.** *Amer. Potato J.* 1951, **28,** No. 10, 732-7. [Cornell Univ., Ithaca, N.Y.]

WEET POTATO

35 Du Toit, J. J. ***Pleospora herbarum* (Pers.) Rabh. (Conidial stage *Stemphylium botryosum* Wallr.) on sweet potatoes.** *Sci. Bull. Dep. Agric. S. Afr. 301* 1951, pp. 47, bibl. 24, illus. [Coll. Agric., Stellenbosch Univ.]

torage of sweet potatoes for 5 to 8 days at a high emperature and under very humid conditions, ollowed by cooler storage conditions, greatly educed the breakdown losses caused by this fungus. -From author's summary.

36 Cockerham, K. L. and Harrison, P. K. **New sweet potato seedlings that appear resistant to sweet potato weevil attack.** *J. econ. Ent.* 1952, **45,** 132. [Louisiana Agric. Exp. Sta.]

wo sweet potato seedlings, L 187 and L 244, ppeared generally to have been less infested with e sweet-potato weevil, *Cylas formicarius elegan- lus*, than other seedlings grown with them, ring 6 years and 3 years of testing, respectively. -E.B.O.

37 Samuels, G. and Landrau, P. **The influence of fertilizers on the carotene content of sweet potatoes.** *Agron. J.* 1952, **44,** No. 7, 348-52, bibl. 17. [Agric. Exp. Sta. Rio Piedras, Puerto Rico]

e influence of major and minor fertilizer elements the carotene content of sweet potatoes (*Ipomoea tatas*) was investigated. Applications of N pro- uced increases of carotene in sweet potatoes ly when the same applications caused increases yield. Similar results were obtained from plications of P and Ca. Carotene content was ected slightly by applications of K and not at all the use of magnesium, manganese, copper or ron.—W.J.B.

SSAVA

8 Normanha, E. S. and Pereira, A. S. Aspectos agronómicos da cultura da mandioca (*Manihot utilissima* Pohl). [**Agronomic aspects of cassava growing.**] *Bragantia* 1950, **10,** No. 7, 179-202, bibl. 3, illus., English summary pp. 201-2. [Received 1952] [Inst. Agron. Campinas, São Paulo, Brazil]

e cassava area of Brazil was 900,000 hectares in 46. Research on cultural technique in pro- ss since 1935 at the Institute of Agronomy, mpinas, is summarized. Over 600 varieties lected from different parts of Brazil have been died, and information is given on varietal pro- ctivity, resistance to disease, and suitability for ustrial use, human consumption and fodder. nting 50 cm.-long cuttings vertically or in a slanting position with some 35 cm. above ground gives better results than the usual practice of placing 15 cm.-long cuttings horizontally in furrows. Fertilizer experiments have shown phosphates to give the highest increase in yield. N or K, either alone or together, had no effect on yield, but when one or both were added to P, yields were better than with P alone. In the State of São Paulo, planting is usually done in October, and harvesting from May to August, but experimental plantings from May to August gave higher yields than the normal October plantings and effected a saving of cuttings, many of which are normally damaged through storage. In field trials, cuttings 20 to 25 cm. long secured better stands and higher root production than shorter cuttings. Spacing from 0.80 × 0.40 m. to 1.00 × 0.60 m. was found to give better results than the 1.20 × 0.60 m. normally used in the State. Tests of various planting depths showed a depth of 10 cm. to be most advisable. Varietal behaviour in regard to bacterial wilt, caused by *Xanthomonas manihoti*, and a virus disease of the witches-broom type has been studied: cuttings of resistant material have been distributed to growers.—G.M.R.

239 Jeyaseelan, K. N. **Studies in growth and yield of cassava. 1. Yield in relation to size and type of set.** *Trop. Agriculturist* 1951, **108,** No. 3, 167-71, bibl. 2. [Received 1952] [Sch. Agric., Peradeniya]

In a randomised block experiment in 1950 using the cassava variety Philippine it was shown that better yields of tubers were obtained from basal cuttings 1 ft. long planted vertically than from apical cuttings 6 in. long planted horizontally.—C.L.S.

JERUSALEM ARTICHOKE

240 Ravault, L. À propos de la culture du topinambour. [**The cultivation of Jerusalem artichoke, *Helianthus tuberosus*.**] *Bull. tech. Inform. Minist. Agric. France 67* 1952, 161-8.

Information is given on the cultivation of Jerusalem artichoke in France, including its position in the crop rotation, requirements as to soil and climate, fertilizers, planting, varieties, cultural methods, diseases, harvesting and uses. Its tubers are used for fodder or for alcohol production, and the stems and leaves for fodder. [From *Herb. Abstr.*]—E.B.O.

FIBRE CROPS

COTTON

241 Ducker, H. C. **Cotton in Nyasaland.** *Nyasald agric. Quart. J.* 1951, **10,** No. 3, 84-94. [Emp. Cott. Gr. Corp.]

242 Nyasaland Department of Agriculture. **Report for the year 1950. Pt. II.** 1952, 13-17. [Zomba]

Experiments on the early sowing and harvesting of cotton to reduce, or avoid, losses caused by the red bollworm, *Diparopsis castanea*, are reported from the Makanga Experimental Station. The experiments were designed to determine, (a) the optimum spacing of maize which would permit cotton to be harvested by 31 July without unduly reducing maize yields ; (b) the optimum date of sowing cotton and the last date on which cotton sowing could be permitted ; (c) the optimum date for removing maize shade, thereby permitting more rapid development of cotton without reducing maize yields. A randomized block lay-out was adopted and the cotton was intersown in furrows between maize which had been sown on ridges at 3 ft. × 3 ft. on 4 December, 1949. The cotton was sown on 14, 21, 28 December and 8 and 30 January. Results of the experiments showed that the maize yields were uniformly good on all the treated plots and averaged 3010 lb. grain per ac. Cotton sown in December was of better quality and gave higher yields at 31 July than cotton sown in January, in spite of heavy attack by red bollworm. The sowing of cotton between rows of established maize appeared to have a depressing effect on the total cotton yield when done too soon after sowing the maize. This deleterious effect did not appear to operate until the dry season was well advanced and therefore would not be a deterrent to advocating the early sowing of cotton if it was intended to uproot it by 31 July. It is assumed that if all cotton were sown early and at the same time, the incidence of bollworm damage in any one plot would be reduced and consequently the accelerating effect of early sowing would be even more marked than in this experiment.

In experiments into the effect on yield of maize and intersown cotton of harvesting maize earlier than normal, 2 experiments (1944 and 1945) showed that there was no significant difference in the yield of maize when harvested early (i.e. stooked or stripped at 105 days) as compared with the normal African method (control) of leaving the maize standing in the field till fully mature (133 days). In the third experiment (1950) early harvesting of maize had a depressing effect on maize yields as compared with the control. Cotton yields in 1944, on the other hand, were significantly increased when the maize was harvested early. In 1945 there was no significant difference in yields of cotton because of early or normal harvesting of maize, but, in 1950, yields of cotton were again increased when the maize was harvested early.

Experiments on the influence of inter-row spacings of maize on the yield and earliness of cotton intersown between the maize, showed that yields of maize were equal, or better, from the 3 ft. and 4 ft. maize spacings than from the 6 ft. spacings and that yields of cotton were highest from the 6 ft. maize spacings.—K.L.

243 White, M. **Cotton production practices in the Sand Mountain area of Alabama.** *Circ. Ala. Agric. Exp. Sta. 101* 1951, pp. 31.
White, M. **Cotton production practices in the Piedmont area of Alabama.** *Circ. Ala. Agric. Exp. Sta. 102* 1951, pp. 29.
Robinson, R. W. **Cotton production practices in the Upper Coastal Plain area of Alabama.** *Circ. Ala. Agric. Exp. Sta. 103* 1951, pp. 31.

A description is given of sample farms in each area, together with cultivation recommendations, power and labour requirements.—P.J.B.

244 Dastur, R. H. and Gopani, D. D. **The relation of spacing to cotton yields in South Gujarat.** *Indian Cott. Gr. Rev.* 1952, **6**, No. 1, 16-21.

A study of the spacing of Surti cotton (*Gossypium herbaceum* var. *acerifolicum*) was carried out in Indore from 1932-7 and from 1939-45. Nitrogen appeared to be a limiting soil factor and it is concluded that the spacing to be adopted depends on the initial N status of the soil.—C.L.S.

245 Chandnani, J. J. **Some practical hints to farmers to increase production of cotton.** *Indian Fmg* 1952, **2**, No. 2, 8-9, and 31-2. [Div. Agron., Indian Agric. Res. Inst., New Delhi]

Optimum times for sowing cotton and some recommended and promising varieties are listed for different parts of India. Cultivation on both irrigated and rain-watered land is described, followed by fertilizer recommendations and a short account of cotton pests and diseases and their control.—C.L.S.

246 Miège, E. L'avenir de la culture du cotonnier en Afrique du nord et spécialement au Maroc. [**The future of cotton growing in French North Africa, especially in Morocco.**] *Rev. Bot. appl.* 1952, **32**, 236-53, bibl. 34.

Information is given on all aspects of cotton growing in Algeria, Tunisia and Morocco. [See also *Fld Crop Abstr.* 4 : 777.]—E.B.O.

247 Arkansas Agricultural Experiment Station. Mimeo. Ser. No. 8. **1951 Arkansas cotton variety tests.** 1952, pp. 10, [Fayetteville]

248 Green, J. M. and others. **Oklahoma cotton varieties ; varietal descriptions and performance test results, 1945-1951.** *Bull. Okla. Agric. Exp. Sta. B-381* 1952, pp. 15, illus.

The summarized results are given of varietal trials at 4 locations during 1945-51. Varietal recommendations are given for western, central and eastern Oklahoma, as well as illustrated descriptions of the following recommended varieties : Lankart 57, Mebane 6801, Lockett 140, Stormproof No. 1, Northern Star, Stoneville 62, Empire, Deltapine 15 and D and PL Fox.—P.J.B.

249 ANGELINI, A. Note sur *Heliothis armigera* et sa sensibilité au DDT. **[Note on *Heliothis armigera* and its susceptibility to DDT.]** *Cot. et Fibr. trop.* 1951, **6,** 193-6, bibl. 7, illus.

Ieliothis armigera was the principal pest on cotton n the Ivory Coast in 1950-1, being the major cause f flower and boll shedding from October to the eginning of December. An insecticidal trial vith DDT was carried out in that season and 5 pplications of Gésarol, a powder containing 0% active DDT, were made at the rate of 30 to 0 kg./ha. from 20 October to 30 November, treatnent being given between 6 and 8 a.m. In the reated plots boll shedding was low, being about 6% of the total production compared with about 0% in the non-treated plots. It appeared that DT acted indirectly on *Platyedra gossypiella* nasmuch it allowed the cotton crop to be harested early, before this pest became active.—.B.O.

50 GAINES, J. C. and others. **Spider mite control on cotton.** *J. econ. Ent.* 1952, **45,** No. 3, 523-6, bibl. 7. [Texas Agric. Exp. Sta., College Station]

he sulphur compounds, Aramite, Ovotran, Sulhenone and Genite-923 (applied as sprays) and dust proved more toxic to the spider mite, *eptanychus texazona,* than to the two-spotted mite, *etranychus bimaculatus,* while the P compounds, arathion and EPN, applied as sprays, were more early equal in effectiveness against both species. In ests conducted in the greenhouse and in the field, ystox spray proved to be an excellent contact oison and controlled mites for a period of 3 or 4 eeks. Octamethyl pyrophosphoramide spray also roved effective for a period of 3 or 4 weeks in the eld. Ovotran, Aramite, Sulphenone and Genite-23 were ineffective as ovicides when applied as parse low volume sprays. Ovotran and Sulhenone sprays killed about one-half of the larvae atching from the eggs on the 4th and 5th day fter the application. Aramite, used either as a pray or a dust at approximately 0.4 lb. of active gredient per acre, gave control of mites in the eld comparable with that of 2 lb. of Ovotran, ulphenone, Genite-923 or 15 lb. of S dust. The compounds, Parathion, TM-4049 (both applied a spray or a dust) and TEPP and EPN (applied a spray) gave effective control at about 0.25 lb. er acre.—From authors' summary.

251 HENDERSON, C. F. and others. **Reduction in white-fringed beetle injury by DDT treatments.** *J. econ. Ent.* 1952, **45,** No. 3, 457-61. [US Dep. Agric. Res. Adm., Bur. Ent. and Plant Quarant.]

The white-fringed beetle, *Graphognathus peregrinus*, was found to cause serious damage to stands of cotton and maize at Collins, Miss., in 1947. Feeding by larvae of this species caused apparent losses of approximately 53% in cotton and 43% in maize. The greatest losses and highest larval populations were on land that had been fallowed for 1 year or more. The least damage, although still considerable, and the lowest larval populations were on land that had been in continuous cultivation for at least 5 years. Soil applications of DDT during the winter of 1947-8 reduced larval populations to such extremely low levels that almost no larval damage was found in cotton or maize in the following summer.—From authors' summary.

252 FIFE, L. C. and others. **Spray versus dust for boll weevil control with ground equipment.** *J. econ. Ent.* 1952, **45,** 16-19. [US Dep. Agric. Res. Adm., Bur. Ent. and Plant Quarant.]

Spray and dust formulations of Chlordane plus DDT, Toxaphene plus DDT, BHC plus DDT, Toxaphene, Dieldrin and Aldrin were tested in large field plots for cotton boll-weevil control at Florence, South Carolina, in 1949. The dusts were applied at about 11 lb. and the sprays at approximately 9 gal. per acre. Approximately the same amount of active ingredients was applied per acre in both the dust and spray for each formulation tested. Dusts and sprays were applied with a 4-row horse-drawn equipment powered by 1.5 H.P. motors. Both the dusts and sprays of all formulations gave good boll-weevil control and a good increase in yield of seed cotton. Dieldrin, in both the dust and spray, was the most outstanding material tested. The plots sprayed with Chlordane plus DDT, Toxaphene plus DDT and Toxaphene produced slightly higher yields than the dusted plots, but with BHC plus DDT the dusted plots outyielded the sprayed plots. For boll-weevil control there was no advantage in adding DDT to Toxaphene, either as a dust or as a spray. None of the dust or spray formulations used caused any commercial injury to the cotton plant. From the standpoint of boll-weevil control, cost of materials and equipment, and the possibility of making spray applications in conjunction with tractor cultivation, low-gallonage spraying showed much promise. —From authors' summary.

253 ARANT, F. S. **Cotton insects and their control with insecticides.** *Circ. Ala. Agric. Exp. Sta. 106* 1951, pp. 36, bibl. 22.

Notes are given on the principal insect pests of cotton in Alabama. Practical recommendations are made for their control.—P.J.B.

254 KNIGHT, R. L. **The genetic control of blackarm disease (*Xanthomonas malvacearum*) in cotton.** [Reprint from] *Compte Rendu 5th Congr. Int. Path. Comp. Istanbul. May 1949* 1949 pp. 11, bibl. 14. [Received 1952]

This paper summarizes the results of 14 years' work on the genetic control of blackarm disease of cotton.—C.L.S.

255 NAYAR, K. V. N. and GADKARI, P. D. **A rapid method for determining the staple length of cottons.** *Indian Cott. Gr. Rev.* 1952, **6**, No. 2, 82-9. [Inst. Plant Industr., Indore, India]

A new method is propounded for estimating the mean fibre lengths of representative sample tufts of cotton, based on the assumption that the thickness of a tuft at any point will be proportional to the number of fibres in the cross section at that point. If T_2, T_3, T_4 . . . . . represent the thickness of the tuft at ¼, ⅜ and ½ inch group lengths starting from the thickest aligned end onwards, then in the case of a tuft having fibres up to 1⅛ in., the mean fibre length in inches (M) can be calculated as follows :—

$$M = \frac{1}{8} + \frac{T_2 + T_3 + \ldots\ldots\ldots\ldots + T_9}{8\,T_2}$$

—C.L.S.

256 NAYAK, H. R. **Effect of groundnut cake on the quality and agronomic characters of cotton.** *Indian Cott. Gr. Rev.* 1952, **6**, No. 2, 76-81. [Cott. Res. Lab. Nanded]

Jaywant cotton, a cross between Dharwar I and II, was grown at Dharwar Farm for three seasons, 1945-8, in a replicated layout to determine the effect on the fibre and agronomic characters of manuring with nil, 20, 40 and 60 lb. N in the form of groundnut cake. All the manurial treatments gave significantly longer fibre lengths than the control. 20 lb. N gave a significantly higher ginning percentage than either 40 lb. or 60 lb. N. —C.L.S.

257 WEAVER, N. **The toxicity of organic insecticides to honey bees [*Apis mellifera*].** *J. econ. Ent.* 1952, **45**, No. 3, 537-8, bibl. 2. [Texas Agric. Exp. Sta., College Station]

Small colonies of bees were placed in screen cages 36 ft. long, set up over 2 rows of cotton plants which were dusted with insecticides. The ascending order of toxicity of the dusts was : Chlordane, Toxaphene, DDT, 3-5-40 and Dieldrin. Limited tests with sprays indicated that sprays are less toxic than dusts when applied to cotton, but that bee mortality is likely to be higher from the drift of sprays on to colonies than from the drift of dusts. —From author's summary.

258 CUANY, R. L. **Impressions of American cotton research.** *Emp. Cott. Gr. Rev.* 1952, **29**, No. 3, 171-81.

The author gives an account of his visit to various cotton research stations in America in 1951. Current research by workers in Arkansas, Oklahoma, Texas and North Carolina is outlined. The emphasis of research is on the integration of cytological, genetic, breeding and technical knowledge for the improvement of the cotton crop. Better pest- and disease-resistance, more versatile fibre quality, better cottons for mechanical cultivation and harvesting are expected from the utilization of genes present in wild and cultivated species of *Gossypium*.—From author's summary.

FLAX

259 POLIŠČUK, M. Zrání a doba sklizně lnu. [**Ripening and time of harvesting of flax.**] *Věstn. čsl. Akad. Zeměd.* (*Bull. csl. Acad. Agric.*) 1951, **25**, 417-25.

260 KUGLER, W. F. and MARCIOTE, V. Lino. Comportamiento agrícola de las variedades. Consejos de siembra. Plagas y enfermedades. [**Flax. Varietal behaviour. Advice on sowing. Pests and diseases.**] *Bol. Prod. Fom. agríc.* 1951, **3**, No. 26, 33-5. [Dir. Gen. Invest. agríc. Argent. (W.F.K.); Esta. Exp. Pergamino, Argent. (C.V.M.)]

Information is given on the behaviour in Argentina of 6 flax varieties.—G.M.R.

261 JENSEN, W. **Effect of boron on germination of flax seed and on respiration of flax seedlings.** *Bot. Gaz.* 1951, **113**, 180-5, bibl. 8, illus. [Univ. Chicago]

Germination was chosen as the stage for studying the role of boron in the plant because at germination the entire plant is in a highly metabolic state. Flax seed (*Linum usitatissimum*) was used because it is a small, highly viable and rapidly germinating seed. The concentrations of boric acid, sodium metaborate, and sodium tetraborate were between 10^{-2}M and 10^{-10}M. These concentrations were lower than those used by earlier investigators into the role of boron in plants. The effects of the various concentrations on germination and respiration are expressed graphically. " The rate of germination was high in comparison with the control in water in those seeds placed in concentrations of 10^{-8}M and 10^{-6}M. Above these concentrations the rate was lower ; below these there was o difference in rate when compared with the conrols. There was a constant depression of respiraion at 10^{-8}M, 10^{-6}M and 10^{-4}M, no depression at 0^{-4}M, and an increasingly greater depression of espiration at 10^{-2}M, in comparison with the conrol. A hypothesis is presented in which the ffect of boron on the respiration of the germinating lax seed is explained as a function of the H_2BO_3-on, while the effect on germination is explained as a unction of the total boron present. The lowered espiration at 10^{-2}M is the only case in which espiration seems affected by total boron—in this ase the action is toxic."—D.B.

HEMP

262 WEBER, J. R. **Nutrition and aeration in relation to the growth of *Cannabis sativa*.** *Proc. Iowa Acad. Sci.* 1951, **58,** 221-8, bibl. 8. [Received 1952] [State Univ. Iowa, Iowa City]

lants of *Cannabis sativa* were grown under a 14 hr. hotoperiod in both high- and low-plane nutrient olutions containing 0.1 and 0.05% total solutes, espectively, with and without root aeration. The ooting medium was a sandy loam soil. Under onditions of a high plane of nutrition plus aeration, oth male and female flowers developed at the ame time; in all the other treatments, the male lowers developed before the female. A high level f nutrition, plus aeration, promoted the most rapid rowth and flowering and the best root developnent. Plants on the low plane of nutrition, withut aeration, were better developed than those on he low plane of nutrition with root aeration. On he low plane of nutrition, aeration appeared to ggravate mineral deficiencies in the plants; on he high plane of nutrition, aeration appeared to timulate the uptake of solutes.—P.J.B.

UTE

263 SANYAL, A. T. **Possibilities of growing jute as line crop and development of a suitable jute seed drill.** *Jute Bull.* 1952, **15,** No. 1, 1-8, illus.

ute seed is sown broadcast in India and Pakistan, eed rates ranging from 8-10 lb. per acre for *orchorus capsularis* and 5-6 lb. per acre for *C. litorius*. Some 20-30% only of the sown seeds are llowed to grow to maturity, the remainder of the lants being thinned out. Weeding and thinning perations account for about 40-50% of the total ost of production. Trials have shown that a pacing of 1 ft. between rows and up to 4 in. vithin the rows will give yields equal to, or exceedng, a broadcast crop. Spacings in excess of 4 in. end to encourage branching. The advantages of ine drilling are outlined and a description given of a hand-pushed jute seed-drill, with instructions for its use.—C.L.S.

HIBISCUS

264 MCGREGOR, C. J. **Hibiscus fibre production in South Africa.** *Jute Bull.* 1952, **15,** Nos. 1 and 2, 33-40 and 84-9.

The three main kinds of hibiscus grown for fibre in S. Africa are *H. kitaibelifolius*, from Brazil, and two varieties of *H. cannabinus*, from Egypt and El Salvador. A full account is given of the growing of these crops, both for seed and fibre production. —C.L.S.

265 OSSENWAARDE, J. G. **Recommendations on the growing of Wild Stokroos.** *Fmg in S. Afr.* 1952, **27,** No. 313, 243-5. [Agric. Res. Sta., Barberton]

Recommendations based on data obtained from agronomic trials at the above Station during 1950-1 are presented. Results of the trials confirmed that the imported Wild Stokroos species and varieties belonging to the Brazil group (*Hibiscus kitaibelifolius*) and the Java group (*H. cannabinus*) were far better than the indigenous species *H. mastersianus* and the South African representatives of *H. cannabinus*.—K.L.

266 MEDINA, J. C. Efeito da época de semeação na produção do *Hibiscus cannabinus* L. [**Effect of time of sowing on productivity in *Hibiscus cannabinus*.**] *Bragantia* 1950, **10,** No. 5, 125-37, English summary pp. 136-7. [Inst. Agron. Campinas, São Paulo, Brazil]

Three years' trials of *Hibiscus cannabinus* were made in 11 localities with various soil types in the State of São Paulo. Sowings were made in randomized blocks at four 15-day intervals from 15 Oct. onwards. Seed rates were: 50 kg. per ha. in 20 cm. drills (1947-8) and 33 kg. per ha. in 30 cm. drills (1948-50). The plants were harvested when in full flower and the average green-weight yield (stems and leaves) was found to be highest from the 2 earliest sowings in practically every case. Average height of plant decreased from the first (15 Oct.) to the last (30 Nov.) sowing. Although 45 days elapsed between the first and the last sowing, there was a difference of only 11 days in the time of opening of the first flower, which is attributed to the plant's marked response to length of day. Results of the trial indicate that as cultivation and decortication can be mechanized the crop is well worth developing as a source of home-grown fibre for coffee-bags.—G.M.R.

267 HAARER, A. E. **Roselle—a second jute substitute.** *World Crops* 1952, **4,** No. 2, 70-1, bibl. 9.

In past trials, the edible roselle (*H. sabdariffa*) has too often been misleadingly compared with kenaf (*H. cannabinus*). It is the inedible roselle (*H. sabdariffa* var. *altissima*) with which comparison should be made. In Java, this last named type is said to require warm, humid conditions and a rainfall of 10 in. per month during the growing period, as against 5 in. per month for kenaf. Furthermore, it is probable that it is better spaced at 12 in. × 12 in., rather than 8 in. × 8 in., which is best for kenaf. It seems, therefore, that roselle as an alternative for jute should not be neglected since in certain environments it may be better suited for this purpose than kenaf.—C.L.S.

268 Talukdar, Sumitra. **Photoperiodic behaviour of *Hibiscus sabdariffa*, L.N.P.5.** *Nature, Lond.* 1952, No. 4324, 458-9, bibl. 3. [Bot. Lab., Presidency Coll., Calcutta]

There are several well-known varieties of this species, one of the most important fibre plants in India. The data reported show that the variety L.N.P.5 is a short-day plant which flowers very early under a 10-hour light period (mean flowering time = 69.25 days, compared with 122 days in the control plants). The behaviour of this variety is thus greatly influenced by daylength and in this respect is similar to the variety *altissima*, reported by Ergle and others, *J. Amer. Soc. Agron.* 1945, Vo. 37, No. 2.—M.H.

OTHER

269 Medina, J. C. Época de semeação da guaxima. [**The time of sowing *Urena lobata* L.**] *Bragantia* 1950, **10,** No. 8, 235-46, illus., English summary pp. 245-6. [Received 1952] [Inst. Agron., Campinas São Paulo, Brazil]

Three years' trials, using a randomized block layout, were conducted in 11 localities of the State of São Paulo to determine the effect of different times of sowing on the growth and yield of *Urena lobata*. Sowings were made at four 15-day intervals, beginning on 15 October. Seed rates were 50 kg. per ha. in 20 cm. drills (1947-8), and 33 kg. per ha. in 30 cm. drills (1948-50). The plants were harvested when in full flower and the green weight of stems and leaves was determined. The highest yields were obtained from sowings on 15 Oct. and 30 Oct. The average height of the plants decreased from the first to the last (30 Nov.) sowing. There was a difference of approximately 8 days in the time of opening of the first flower between the plants of the first and last sowing.—G.M.R.

270 Feuell, A. J. and Jarman, C. G. ***Pavonia urens* fibre from Uganda.** *Colon. Plant Anim. Prod.* 1951, **2,** No. 4, 306-9, illus.

Results of tests showed that in strength and fineness this fibre compared unfavourably with jute. It is doubtful whether it could be spun to the fine counts required in hessian manufacture. It probably resembles the fibre of *Hibiscus cannabinus* in its properties.—W.J.B.

GENERAL

271 Ercilla, C. A. L. Aprovechamiento industrial de plantas indígenas textiles. [**Industrial utilization of indigenous textile plants.**] *Bol. Prod. Fom. agríc.* 1951, **3,** No. 29, 3-71, bibl. 27, illus. [Dir. Cult. Espec., Minist. Agric. Argent.]

Three vernacular names cover 25 different species of the Bromeliaceae which grow wild in Argentina; of these at least 8 are of use as fibre plants. Shortage of imported jute during the war drew attention to their value, and while the present study is largely concerned with Government surveys of the regions, the analyses of the soils in which these plants grow and with problems of economic processing and costs of production, it also includes a botanical and historical description of the plants and their distribution in Argentina (pp. 6-13), as well as an account of the physico-chemical characters of the different fibres obtainable, their uses and their yield (pp. 24-9).—G.M.R.

OIL CROPS

SESAME

272 Pearman, R. W. and others. **Wild sesame seed from Northern Rhodesia.** *Colon. Plant Anim. Prod.* 1951, **2,** No. 4, 297-9.

The seed of wild sesame, *Sesame angolense*, was found to contain only 28.4% oil. However, the high sesamin content of the extracted oil suggests its use as a synergist in pyrethrum sprays.—W.J.B.

LINSEED

273 Clydesdale, C. S. and Groom, J. L. **Linseed growing in Queensland.** *Qd agric. J.* 1952, **74,** No. 6, 311-22, illus.

274 Elliott, C. S. **Trials of linseed varieties 1948-1950.** *J. nat. Inst. agric. Bot.* 1951, **6,** No. 1, 29-44, bibl. 4.

The article is in two parts. Part I gives the results and information obtained from trials carried out in England in 1948-50 using the following varieties: Bison, Dakota, Minerva, Redwing, Rocket, Royal, Sadd's English, Sheyenne, Vaanila, Valuta (Sv. 01040) and Moroccan. The trials have shown that varieties superior to Royal and Redwing are now available. Valuta is a late-ripening variety which an be recommended for further trial in areas where Royal has previously been successful. Similarly, Dakota is an early-ripening variety and is recomnended for further trial in areas in which Redwing has previously been found better than Royal. Part II describes the characters used to identify the inseed varieties, provides a summary of the more mportant points of recognition and the differences between the varieties Royal, Redwing, Valuta and Dakota : it also tabulates the main characters of he flower, capsule and seed of the 11 varieties eported on in Part I.—C.L.S.

75 BUNTING, E. S. and BLACKMAN, G. E. **Varietal differences in linseed.** *J. nat. Inst. agric. Bot.* 1951, **6,** No. 1, 45-8.

his paper summarizes the results of varietal rials carried out near Oxford in the 3 years 1948-0. The data should be regarded as supplemenary to the results of the NIAB trials referred to 1 the previous abstract. Dakota and Valuta, on verage, outyielded Redwing and Royal, respecively, and are comparable to them in oil content. hey are also similar in their resistance to MCPA. he results of trials with 8 other linseed varieties re also given.—C.L.S.

76 JAKOBSON, G. Aktuella ogräsbekämpningsproblem i oljelin. [**Current problems of weed control in linseed.**] *Svensk Frötidn.* 1952, **21,** 45-9.

n trials in Sweden during 1950-1, comparisons ere made of the effect of 4K-2M and KOC (a ixture of 4K-2M and DNOC) on the yield of nseed and on weeds growing in the crop, the erbicides having been applied at rates of 5, 10 nd 15 l. per ha. when the linseed was 5 to 8, 8 to 12 nd 12 to 20 cm. high. In all cases the use of OC resulted in higher linseed yields than did K-2M. Highest yields followed spraying with ther herbicide when the plants were 5 to 8 cm. gh. The most effective rates of application were to 10 l. per ha. for KOC ; and 5 l. per ha. for K-2M. In further trials with a number of other erbicides, the use of DNOC and KOC gave the ghest linseed yields, followed by Agroxone and erbex 6 (4K-2M+ 2,4-D amine salt). Notes are ven on the characteristics and limitations of these erbicides and their effect on a number of weed pecies. The results are also given of trials to etermine the effect of the herbicides on the oil eld and oil content of linseed, 4K-2M did not pparently affect oil yields. KOC applied at rates 10 to 15 l. per ha. resulted in a slight rise in the l content of linseed, particularly when applied to e crop in the early stages of growth.—P.J.B.

7 AGRICULTURAL GAZETTE OF NEW SOUTH WALES. ***Heliothis* caterpillar in linseed crops.** *Agric. Gaz. N.S.W.* 1952, **63,** No. 3, 119-20.

A summary is given of the discussion at a Conference of farmers, research workers and members of commercial firms, on the incidence and control of *Heliothis* caterpillar in linseed crops of New South Wales. Although older caterpillars react more slowly to DDT than younger ones, there is no evidence to suggest that caterpillars are building up resistance to DDT. Experiments have shown that 1 lb. per ac. of DDT applied as a spray at 100 gal. per ac. will usually kill *Heliothis* caterpillar present in the linseed crop. The Conference agreed that DDT formulations and application methods by plane or ground equipment should be investigated further.—K.L.

SAFFLOWER

278 RICE JOURNAL. **Safflower, a rotating crop for rice land.** *Rice J.* 1952, **55,** No. 9, 19-21, illus.

Notes are given on the use of safflower (*Carthamus tinctorius*) as a crop for rotating with rice in California. Safflower appears to be a better crop for this purpose than most others, such as beans, maize, grain sorghum, barley and wheat, all of which are relatively poorly adapted to the heavy, badly drained rice-soils, the heavy winter rainfall and the hot, dry summers of California. Where the water table is 2 to 3 feet below the surface, safflower yields 1500 to 2000 lb. seed per ac. Three safflower varieties are in use at present, *viz.* N6, N8 and N852; all produced by the University of Nebraska. N6 is recommended for spring sowing on irrigated soils and is resistant to root rot. N8 is recommended for autumn sowing on irrigated soils and is resistant to frost and root rot. N852 is a high-yielding selection recommended for dry land, but is susceptible to frost damage and root rot. N852 is rapid-growing and competes well with weeds. A new variety, N10, a selection from N852, is to be released. It has similar characteristics to N852, but yields 10 to 15% more.—P.J.B.

279 MCGREGOR, W. G. and HAY, W. D. **Safflower—Canadian experiments.** *Sci. Agric.* 1952, **32,** 204-13, bibl. 12. [Cereal Div. Exp. Fms Serv., Dep. Agric., Ottawa, Canada]

Notes are given on the botanical characteristics and commercial uses of safflower (*Carthamus tinctorius*). Yield trials with safflower in Canada have been carried out since 1936 in a number of provinces. All the material used has been introduced, mostly from the USA, and has comprised 26 lines of different origin. Yields have been highest in southern Alberta. In trials at Lethbridge, Alberta, seed yields were almost twice as great on irrigated land as on dry land, though the crop matured one to two weeks later on the irrigated plots. Safflower in Alberta appeared to give yields comparable to those from linseed, was as easily handled as linseed and was better able to compete with weeds. An outline is given of cultivation practices recommended for safflower in Canada. It is considered that breeding and selection work in the future should produce safflower varieties productive enough to take their place beside the other oil-seed crops now grown in Canada.—P.J.B.

SUNFLOWER

280 ANDRÉ, E. Le tournesol ou " grand soleil " (*Helianthus annuus* L.), plante oléagineuse. 2. [**Sunflower (*Helianthus annuus*), an oil crop. 2.**] *Oléagineux* 1952, **7,** 339-44, bibl. 5.

[See *Fld Crop Abstr.* 5 : 1255.] Sunflower yield is said to vary throughout the world from 5 to 40 q. of seed per ha. The testa weighs on an average about 40% of the whole achene. Sunflower breeders, particularly in the USSR, aim at lowering this percentage to 33–35. Up to 59% of oil can be obtained from the decorticated kernels, but a yield of 52 to 53% of oil is considered satisfactory. Thus 100 kg. of undecorticated seed yield about 33 kg. of oil. Information is given on the chemical composition of the sunflower kernel, the technology of oil extraction, the chemical composition of the oil and its uses.—E.B.O.

281 ANDRÉ, E. Le tournesol ou " grand soleil " (*Helianthus annuus* L.). Plante oléagineuse. Pt. 2. [**Sunflower (*Helianthus annuus* L.), an oil crop. Pt. 2.**] *Oléagineux* 1952, **7,** No. 8-9, 473-9, bibl. 16.

[See previous abs.] This article is concerned with sunflower cake and meal.—E.B.O.

282 TREPAČEV, E. P. [**The effect of irrigation on oil content of sunflower varieties.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, No. 5, 48-53. [Chem. Lab., State Comm. Var. Trials, Grain, Oil Crops, Herb. Plants]

Results of varietal trials with *Helianthus annuus* have shown that in order to evaluate adaptations of the different types to various regions, grain yield is an inadequate criterion on which to base such evaluation, and that chemical analyses are also necessary. Oil and protein content and other qualitative characteristics of the seed fluctuate greatly, depending on whether the crop is irrigated or not. Five of the most widely distributed varieties of sunflower have been studied, grown with and without irrigation, but in all other respects under uniform conditions. The varieties were :— Saratovskiĭ 10 and 169, VNIIMK 4966 and 4036 [VNIIMK = All Union Sci. Res. Inst. for Oil Crops], and Ždanovskiĭ 8281. Tabulated data include information regarding the effect of irrigation on : seed yield of the 5 varieties ; oil content of the seed ; oil yields from seed of the varieties when grown in different provinces (Saratov, Stalingrad, Dagestan, Aktjubinsk) ; protein content of seed ; and oil quality (specific gravity, oleic-acid content, and iodine number). While there is evidence that the physico-chemical properties of the oil from the seed are not greatly affected by irrigating the crop, there is, however, indication that the oil from irrigated varieties has a higher iodine number, and, in some instances there is an increase in oleic acid. From the aspect of the nutrient value of the oil it is desirable to maintain a low iodine number and in this respect of oil quality the varieties Ždanovskiĭ 8281 and VNIIMK 4966 are the best. It is concluded that while the use of irrigation is a means of increasing crop yields, at the same time the intensity of the biological processes in all varieties of sunflower is thereby lowered. Before introducing the crop into new areas it is necessary to re-evaluate all the existing material and to breed high-yielding types suitable for production under irrigation and mechanization.—M.H.

RAPE

283 ANDERSON, G. **The cultivation of winter rape and other oil plants in Sweden.** *World Crops* 1952, **4,** No. 9, 301-4, illus. [Swedish Plant Breed. Sta., Svalöf]

A review is given of the development of oil-seed crops in Sweden. During 1951, a total of 155,500 ha. were under cruciferous oil-seed crops, the total oil yield being 85,700 tons, with 118,000 tons of press cake as a by-product. Winter rape (*Brassica napus* var. *oleifera*), with an average yield over a 10-year period of 1700 kg. of seed (18% moisture content) per ha., is the highest yielding of all the oil-seed crops grown in Sweden. The average yield of linseed over the same period was 1192 kg. per ha. Camelina (*Camelina sativa*) gave a yield of 1603 kg. of seed per ha.—P.J.B.

284 ANDERSON, G. Svalöfs Gute vårrybs. [**Svalöfs Gute summer turnip rape.**] *Sverig. Utsädesförēn. Tidskr.* 1952, **62,** 9-15, English summary pp. 14-15.

Summer turnip rape (*Brassica campestris* var. *oleifera* subvar. *annua*) is a crop comparatively new to Sweden, where its area has increased from 1417 ha. in 1949 to 10,791 ha. in 1951. It is particularly well adapted to peat soils, where its short vegetative period of about 3 months enables it to mature in conditions where summer rape [*B. napus* var. *oleifera* subvar. *annua*) will not always mature. The first 2 varieties grown in Sweden were Sv. 0300, a mass selection from a German variety, and Fenno. In 1951, the Swedish Seed Association placed Gute on the market. This is a mixed F_1 population nade up of 5 strains, Sv. 0300 and Sv. 0302 to 305, inclusive. Morphologically, Gute cannot be listinguished from Sv. 0300. In 1947-51, Gute vas compared with Sv. 0300, Fenno and the ummer rape Sv. Regina B in 33 trials on peat soils nd in 28 on mineral soils in south Sweden. The nean seed-yield of Sv. 0300 was 1552 kg. per ha. n mineral soils and 1112 kg. per ha. on peat soils. Gute gave 4% higher yields than Sv. 0300 on nineral soils and 9% higher yields on peat soils. Fenno gave very much the same yields as Sv. 0300 n both soil types, in limited trials. On mineral oils, Sv. Regina B summer rape outyielded Gute y 7%, but gave 31% lower yields than Gute on eat soils. The mean oil-content of Gute was 1.1% on mineral soils and 39.3% on peat soils; his was almost the same as that of the other arieties tested. Straw stiffness was better in Gute than in Sv. 0300, or Sv. Regina B. Gute natured at the same time as Sv. 0300 on both soil ypes; Fenno was 5 and 7 days later and Sv. Regina B was 14 and 23 days later than Gute on nineral and peat soils, respectively.—P.J.B.

THER

85 SAZANOVA, L. V. **[Regionalization of Indian mustard (*Brassica juncea*).]** [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1951, **18,** No. 7, 54-8.

he majority of the numerous oil crops grown in he USSR are cultivated in the southern regions. ndian mustard, the seeds of which have an edible-il content of 35 to 40%, is promising for cultivaion in the northern regions. It is particularly uitable for growing in parts of the central zone f the European territory of the USSR, in the orthern non-black earth zone, and in Western iberia and Kazakhstan.—R.P.J.

286 BAGGE, H. Forsøg med gul sennep til modenhed. Sortskulture- og gødningsforsøg 1940-1949. **[Trials with yellow mustard (*Sinapis alba*) for oil seed. Varietal, cultural and manurial trials 1940-1949.]** *Tidsskr. Planteavl* 1951, **55,** 121-35.

Following trials at Tystofte, Aarslev and Hojer Experiment Stations, Denmark, with yellow mustard grown for oil seed, it was recommended that: ordinary Danish commercial seed should be used; sowing should be carried out during the latter half of April; where it is desired to horse-hoe the crop the distance between the drills should be 45 to 60 cm. ,otherwise 10 to 12 cm.; a seed-rate of 10 kg. per ha. should be employed; N corresponding to at least 600 kg. calcium nitrate per ha. should be applied to the crop.—R.P.J.

287 JAKHANWAL, G. P. and TANDON, R. K. **Detection of adulteration of mustard with argemone seeds.** *Agric. anim. Husb., Uttar Pradesh* 1951, **2,** No. 2, 30-2.

A description is given of the characters of the poisonous seed of *Argemone mexicana* (Mexican or prickly poppy), the oil from which is sometimes used as an adulterant of mustard oil.—C.L.S.

GENERAL

288 SELLSCHOP, J. **Oil-bearing crops.** *Fmg in S. Afr.* 1952, **27,** No. 312, 209-10, 218 and 226. [Coll. Agric. Potchefstroom]

An account is given of the production, processing and use of oil from the main oil-bearing crops grown in the Union of South Africa. The crops included in this survey are: safflower, soyabeans, groundnuts, sunflowers, cotton, maize and *Sesamum* sp.—K.L.

LAND USE, SURVEYS AND MANAGEMENT

89 ASHBY, A. W. and BRITTON, D. K. **Britain's "marginal land". 1. Marginal conditions in agriculture. 2. Possibilities and limitations. 3. Social aspects of policy.** *Scot. Agric.* 1951, **31,** 9-13, 75-80 and 119-24. [Agric. Econ. Res. Inst., Univ. Oxford]

n these three articles the authors discuss the ature of marginal land, its physical and economic mitations and possibilities, and the principles upon hich a policy for its more effective use should be ased.—K.L.

90 HAYES, G. G. **A survey of West Highland agriculture.** *J. agric. Econ. Soc.* 1952, **10,** No. 1, 35-52.

An account is given of an agricultural economic survey, carried out between the years 1944 and 1950, on crofting in the counties of Caithness, Sutherland, Ross, Inverness and Argyll on the west coast of Scotland.—C.L.S.

291 WELSH AGRICULTURAL LAND SUB-COMMISSION. **Borth Bog investigation report.** 1952, pp. 15, maps 2, London; HMSO, 2s. 6d.

This is the report to the Minister of Agriculture by the Welsh Agricultural Land Sub-Commission on its investigation into the agricultural future of Borth Bog on the south side of the Dovey estuary in Wales. The principal recommendations made are: (a) That ley farming with a high proportion of grass and with the emphasis on milk and fat lamb production is, generally speaking, the appropriate system for the area. (Paragraph 22.) (b) That the tidal embankments and the drainage system must at all times be maintained in good and efficient condition under unified control. (Paragraph 29.) (c) That some amalgamation of existing agricultural units and the adjustment of boundaries will be required over a period of years to make sound economic holdings, containing as far as possible a proportion of alluvial as well as of peat soils. (Paragraph 30.) (*d*) That where necessary suitable homesteads be rehabilitated and adequately equipped. (Paragraph 32.) [From *Herb. Abstr.*]—A.G.G.H.

292 De Sutter, R. Évolution de la productivité de l'agriculture belge. [**The evolution of productivity in Belgian agriculture.**] *Rev. Agric., Brux.* 1951, **4**, 156-66, English and German summaries pp. 165-6. [Serv. Écon., Minist. Agric., Belgium]

The great increase in productivity which has taken place in Belgian agriculture during the first half of this century is exclusively due to the improvement of the unit-yield both in crop and animal production. This evolution of productivity is studied by comparing the productions of the years 1910, 1929 and 1949. Compared with 1910, the value of the total agricultural production had increased by about 8% in 1929 and 18% in 1949, while the active agricultural population in 1949 was about half that of 1910. The relative value of animal production has increased while that of crop production has decreased during the period, the relative value of animal production averaging 75% of the total agricultural production. The absolute value of crop production was approximately the same in the 3 years examined, while the area devoted to crop production (meadows excluded) showed a 35% decrease during the period. The increase in yield per unit area from the principal crops is tabulated. The area under meadows in 1949 was 52% greater than in 1910. The absolute value of the animal production in 1949 was 23% higher than in 1910, although the total number of animals decreased. [From *Herb. Abstr.*]—E.B.O.

293 Grooten, R. Aperçu de la situation de l'agriculture belge en 1951. [**A survey of Belgian agriculture in 1951.**] *Rev. Agric., Brux.* 1952, **5**, 325-66, illus. [Serv. Écon., Minist. Agric., Belgium]

294 Visser, W. C. **Agriculture.** *Soil Sci.* 1952, **74**, No. 1, 1-13. [Cultuurtech. Dienst, Utrecht]

This is a general survey of agriculture in the Netherlands.—E.B.O.

295 Erinc, S. and Tuncdilek, N. **The agricultural regions of Turkey.** *Geogr. Rev.* 1952, **42**, 179-203. [Geogr. Inst., Istanbul Univ., Turkey]

The results are given of a regional survey of the agriculture of Turkey, based on the 5 main physiographic regions of the country. Grain production predominates, 87.7% of the total cultivated area being under grain crops. In the interior regions, the percentage rises to 95 and nowhere falls to below 60 to 70, even in the coastal margins, where mixed cropping is the rule. Except for the Black Sea coast, where maize is the main grain crop, wheat and barley are grown everywhere, their respective percentages of the total cultivated area being 52 and 26.—P.J.B.

296 Neumark, S. D. **The importance of agriculture in Caribbean economy.** *Caribb. Econ. Rev.* 1951, **3**, Nos. 1 and 2, 1-47.

This is a review of the different factors affecting the present position of agriculture in the Caribbean, and of the potentialities which exist for agricultural expansion in each of the component territories. Planning agricultural production and trade on a Caribbean-wide scale should replace planning for each territory in isolation. [From *Herb. Abstr.*]—C.L.S.

297 Chiuderi, A. and Boninsegni, S. Condizioni attuali dell' agricoltura messicana ed indirizzo della politica agraria. [**Present situation of agriculture and agricultural policy in Mexico.**] *Riv. Agric. subtrop.* 1952, **46**, No. 4-6, 103-32.

298 Rounce, N. V. **Technical considerations in the economic development of Sukumaland [Tanganyika].** *Emp. J. exp. Agric.* 1951, **19**, No. 76, 253-64.

After discussing the prevailing agricultural conditions and customary agricultural practices in Sukumaland, the methods and conditions necessary for increasing production from the land are outlined. These methods include soil and water conservation by means of tie-ridging and contour cultivation, early planting and weeding of crops, crop rotation, use of animal manure, selection and breeding of the important crops (cotton, sorghum, rice, cassava), pasture management and the use of modern machinery to augment the hand-hoe.—K.L.

299 Rowaan, P. A. De inundaties gedurende 1944-1945 en hun gevolgen voor de landbouw. Deel III. Overzicht van inundatieonderzoek in Nederland tot 1944. [**The inundations during 1944 to 1945 and their effect on agriculture. Part III. Survey of**

investigations of inundations in the Netherlands up to 1944.] *Versl. Landbouwk. Onderz.* 1951, **57,** No. 3, pp. 36, bibl. 37. [Landbouwproefstat Bodemk. Inst, T.N.O., Groningen, Netherlands]

n the basis of experiences following the inunda-
on of parts of the Netherlands during 1939 and
40 in the face of the threat and actuality of
e German invasion, a survey is given of measures
ken for the removal of salt from the soil, the
oice of crops and cultivations immediately
llowing the draining of soils.—P.J.B.

0 BERG, C. van den. De inundaties gedurende 1944-1945 en hun gevolgen voor de landbouw. Deel 6. De reactie van landbouwgewassen op het zoutgehalte van de bodem. **[The inundations of 1944-1945 (in the Netherlands) and their effect on agriculture. Part 6. The reaction of field crops to the salt content of the soil.]** *Versl. Landbouwk. Onderz.* 1950, **56,** No. 16, pp. 87, bibl. 41, English summary pp. 80-2.

ring 1945-8, data were collected of crop yields on
ht, marine-clay soils in the south-western part of
e Netherlands. These soils had been previously
oded with salt water for at least 6 months, but
d not yet deteriorated in texture and were judged
be reasonably good arable land. The crops
died were: spring barley, mangolds, oats, sugar-
et, spring wheat, flax, Wier beans, potatoes,
ppy, peas, brown beans and white beans. They
given here in their respective order of sensitivity
salt, as determined in these studies, with spring
ley the least sensitive. Data are given of the
inity limits during 1946, 1947 and 1948 at which
se crops would give a reasonable yield, cal-
ated at 75% and above of the normal average
lds on non-saline soils. The data demonstrate
t during 1947, a very dry year in which growing
ditions were unfavourable, the salinity limit for
crops was extremely low. Data are also given
the salt tolerance of winter barley, wheat and
, though they are not included in the above-
ntioned crops owing to their longer growing
son. Among the results of the studies were the
owing: the 1000-grain weight of the cereals
ained fairly stable up to a salinity of 8 g. per l.
soil moisture in the 5 to 20 cm. soil layer, at
ch concentration the 1000-grain weight was
% lower than that of crops grown on non-saline
s. Wheat was more markedly affected than
s or barley. The malting quality of barley
led to decline on salty soils. The baking
lity of wheat did not appear to be much affected
salty soil. Potatoes (Bintje variety), grown on
he soils, were hard and consequently of reduced
king quality. In the case of sugar-beet, increas-
the soil salinity to 8 to 10 g. per l. of soil mois-
reduced sugar content by about 20%, compared with that grown on non-saline soils, though in 1948, when growing conditions were normal to fairly good, there was no apparent reduction in sugar content. In 1948, the upper salinity limit for dry-matter yield in sugar-beet was 9 g. per l. of soil moisture, compared with 7.3 in 1946, a very good year, and 1.5 g. in 1947, a year of very poor growing conditions. In the case of flax, fibre percentage and fibre quality declined sharply as soil salinity rose above 3 g. per l.—P.J.B.

301 VERHOEVEN, B. **Embankment and cultivation of marine foreland.** *Soil. Sci.* 1952, **74,** No. 1, 91-5, illus. [Wieringermeer (Noordoostpolderwerken), Afdeling Onderz., Kampen]

New farming land is acquired through sedimentation along the coasts of the Netherlands. After the newly-formed soil has been enclosed by embankment, the land is put under cultivation by methods which are described. Sowing in the year of enclosure is seldom possible as the excess of salt must first be washed out by rain. In the second summer *Brassica napus* is sown and again grown for a second year, after which nearly all crops suited to Dutch marine clay soils can be grown. In the first 5 to 10 years the soil is readily worked. Sugar-beet is an important crop. Cereals are subject to lodging, because of the large quantities of N released by the decomposing sod.—E.B.O.

302 HOOGHOUDT, S. B. **Tile drainage and subirrigation.** *Soil Sci.* 1952, **74,** No. 1, 35-48, bibl. 12, illus. [Landbouwproefstat Bodemk. Inst. T.N.O., Groningen]

Because of topography and climate, farming in the Netherlands necessitates a constant struggle to keep out water on the one hand and to supply water on the other. Much of the country is below sea-level. Drainage prevents a too high ground-water level in winter and spring. Tile drainage is applied almost exclusively on the heavier soils, mainly on arable land. Irrigation, given at appropriate periods, counteracts the penetration of salt water from the sea by keeping the ground-water level sufficiently high. Subirrigation by means of trenches, or lines of tiles, or mole channels, is applied on grassland, mainly on sandy soils, but sometimes also on peaty or clayey soils. Tile drainage and subirrigation, both controlling the ground-water level, but in opposite directions, are closely related and are discussed together in this article. Practical information on their working is given. The relation of ground-water level to crop yield and of soil permeability to water control are examined.—E.B.O.

303 ESHUIS, J. A. **Reclamation of heathland and its cultivation.** *Soil Sci.* 1952, **74,** No. 1, 49-56, illus. [Nederland. Heidemaatschappij, Arnhem]

A greater part of the farmland on sandy soils in the Netherlands has been acquired by heathland reclamation, made possible by the introduction of chemical fertilizers. Heathlands are classified as high, medium-high and low. The soil, the vegetation and the moisture condition of these 3 types of heathland are described. The best use of the soils reclaimed from high heathland is to put them under forest. Rye is sometimes grown but yields 1500 to 1700 kg./ha. only. The soils reclaimed from the medium-high heathland, if supplied regularly with organic matter, can be grown with rye, potatoes and mangolds. The soils reclaimed from the low heathland are the best, the higher of these soils being particularly suitable for mangolds, potatoes and rye while the lower ones are used for pasture as they are too wet for arable crops. The methods followed in reclaiming these soils are described and conditions are specified under which a second reclamation is advisable. Information is given on the management of the newly reclaimed soils, particularly their manuring. A seed mixture of 80 kg. of yellow lupin (*Lupinus luteus*) and 20 kg. of serradella (*Ornithopus sativus*) [per ha ?] is sown first for green manure. A second crop, preferably rye, is then grown. The lack of water, which is the limiting factor for crop production on the high sandy soils, can be overcome by sprinkler irrigation during droughts, the water being drawn from deep wells.—E.B.O.

304 Mohrmann, K. J. M. **Reclaimed peat soils and their agricultural importance.** *Soil Sci.* 1952, **74,** No. 1, 57-68, illus. [Nederland. Heidemaatschappij, Arnhem]

For each of the principal peat districts of the Netherlands, information is given on: peat digging, the resultant pools and their drainage, the reclamation of this land and its agricultural utilization. While the low peat areas are now generally devoted to grassland, the high peat soils, after manuring, are generally cropped with potatoes, rye, oats and mangolds. Potato yields are frequently as high as 35,000 kg./ha.—E.B.O.

305 Zuur, A. J. **Drainage and reclamation of lakes and of the Zuiderzee.** *Soil Sci.* 1952, **74,** No. 1, 75-89, bibl. 12, illus. [Wieringermeer (Noordoostpolderwerken), Afdeling Onderz. Kampen]

The methods followed in the Netherlands for draining lakes and the Zuiderzee, and for reclaiming the new land, are described. The clayey soils are used mainly for arable crops and the sandy soils for grass. Cereals have a prominent place in the crop rotation. Sowing, if done shortly after draining, presents little difficulty, as the soil is still bare and has a crumblike structure. If left until later, the soil becomes covered with natural vegetation (e.g., *Phragmites communis*) which must be removed before sowing. The numerous ditches are an obstacle to farming and are replaced by tile drains as soon as possible. Reclamation of the large polders of the Zuiderzee, each of 50,000 ha., is carried out by the Government. When all the soil has been put under cultivation, farms built and the social organization of the polder completed, the land is leased to farmers, each holding comprising 10 to 50 ha., generally 24 to 36 ha. The clayey soils are very fertile. One ha. yields as much as 4000 kg. of wheat or oats, 25,000 kg. of potatoes or 45,000 kg. of sugar-beet.—E.B.O.

306 Groenman, S. **Physical planning in reclaimed and newly colonized areas** [in the **Netherlands**]. *Soil Sci.* 1952, **74,** No. 1, 97-101. [Univ. Utrecht]

307 Institute of Agrarian Affairs. **The consolidation of farms in six countries of Western Europe.** *Internat. J. agr. Aff.* 1952, **1,** No. 4, pp. 61, 5s.

The subject is dealt with in six articles entitled: consolidation of agricultural land in Denmark, by K. Skovgaard, pp. 9-14. Land fragmentation and measures of consolidation in Finland, by K. U. Pihkala and S. Suomela, pp. 15-23. Regrouping of farm holdings in France, by D. R. Bergmann, pp. 24-32. Re-allocation of farm land in the Netherlands, by A. Rienks, pp. 33-43. Land fragmentation and dispersion in Italy, by Ugo Sorbi, pp. 44-53. Redefinition of farms in Sweden, by Sölve Kihlberg, pp. 54-61.—A.G.G.H.

308 Hanks, R. J. and Tanner, C. B. **Water consumption by plants as influenced by soil fertility.** *Agron. J.* 1952, **44,** 98-100, bibl. 7. [Wisconsin Univ., Madison]

Trials were carried out with maize and oats during 1949 and 1950 to compare the water consumption per unit of yield where the crops were supplied with different amounts of irrigation water and different levels of manurial treatment. On plots where a high level of manurial treatment was applied, maize grain yields per in. of water used ranged from 1.14 to 1.64 times those on plots receiving low levels of manurial treatment; under similar conditions, oat grain yields per in. of water used were 1.33 to 2.29 times greater. It is concluded that in areas where irrigation is practiced, or where water is not a limiting factor, a high level of soil fertility promotes more efficient use of water than where the level of soil fertility is low and that it is essential to provide adequate soil nutrients to obtain the highest yield per unit of water applied.—P.J.B.

9 VAN BAVEL, C. H. M. and WILSON, T. V. **Evapotranspiration estimates as criteria for determining time of irrigation.** *Agric. Engng, St. Joseph, Mich.* 1952, **33,** No. 7, 417-18, and 420, bibl. 11. [N. Carolina Agric. Exp. Sta., Raleigh]

he comparison of estimates of dates of irrigation based on soil tensiometer readings and calculations of evapotranspiration has shown good agreement. The system of using evapotranspiration and rainfall measurements as a means of estimating irrigation dates is very simple and is held to merit further study.—P.J.B.

FARMING SYSTEMS AND PRACTICES

10 WILLEMSEN, W. and JANSEN, J. H. Een voorbeeld van een bedrijfsplan voor een gemengd zandbedrijf met 10 ha. cultuurgrond. [**A plan of a farming system for a mixed farm on sandy soil with a cultivated area of 10 ha.**] *Maandbl. LandbVoorlDienst* 1952, **9,** 41-61. [Inspect. Weide- en Voederbouw, Wageningen, Netherlands]

complete cropping and stocking plan is given for 10 ha. farming unit in the Netherlands on sandy oil of moderate fertility. The ratio of grassland arable is 40 : 60. The 10 ha. are under 1 ha. ermanent pasture, 3 ha. grass ley, 3 ha. cereals, nd 3 ha. of other crops, the cropping plan being esigned to keep the requirement for imported ock-feeds to a minimum. The crop rotation iggested is as follows : 4 years' grass ley/beet/ arley/peas/oats/potatoes/rye/maize/potatoes. The creage under the crops in a given year being as ollows : 3 ha. grass ley, 0.75 ha. maize, 0.75 ha. ach of winter rye, spring barley and oats, 1.20 a. fodder potatoes, 0.15 ha. seed potatoes, 0.05 a. early culinary potatoes, 0.1 ha. main-crop ulinary potatoes, 0.45 ha. fodder-beet, 0.3 ha. igar-beet, and 0.75 ha. peas, beans, or fodder ipin. Details are given of the probable economic eturns of such a system.—P.J.B.

11 SPINDLER, F. Les survivances de l'ancien assolement triennal obligatoire dans le sud de l'Alsace. [**The survival of the old compulsory 3-year crop rotation in the south of Alsace, France.**] *Bull. tech. Inform., Minist. Agric. France 68* 1952, 223-8, illus.

t is explained how the old rotation of winter cereal pring cereal/fallow, practised in the Middle Ages, as survived in an improved form up to the present. s it is not compatible with modern requirements, is thought to be bound to disappear completely. -E.B.O.

12 PEARCE, J. **Farming in Berkshire.** *J. Brit. Grassl. Soc.* 1952, **7,** No. 2, 37-42, bibl. 5, illus. [Univ. Reading]

fter outlining the general features of the county a etailed description is given of the systems of farmig practised on the Downs and in the Vale of the Vhite Horse, the valley of the Kennet and in East erkshire.—K.L.

313 METGE, R. La mécanisation et le système cultural africain. [**Mechanization and the African farming system.**] *Agron. trop., Nogent* 1952, **7,** 136-49. [Serv. Rech. Agron., Office du Niger]

An account is given of the efforts to introduce mechanization into the African farming system made by the Office du Niger, one of the most important centres in French tropical Africa for studies in agricultural mechanization. It is thought that under appropriate conditions mechanization is the first and most important factor in raising the living standards of African farmers. [From *Herb. Abstr.*]—E.B.O.

314 VAN BEUKERING, J. A. De ontwikkeling van de landbouw in Suriname en de voorlopige resultaten van de proefpolder nabij Nieuw Nickerie. [**The agricultural development of Surinam and results obtained to date at the experimental farm near Nieuw Nickerie.**] *Landbouwk. Tijdschr.* 1952, **64,** 378-87, illus., English summary 386-7. [Dep. Landbouw, Veeteelt en Visserij, Surinam]

A synopsis is given of the past and present structure of agriculture in Surinam. At present, the agricultural potential of Surinam is poorly developed, the land being thinly populated and the labour supply limited. Most farming is done on a subsistence basis, with rice as the only crop. It is considered that, with due protection of the organic-matter content of the predominantly clay soils and with adequate drainage, the growing of a second crop after rice, such as soyabeans, should be initiated. This would provide the farmer with full employment throughout the year. An account is given of the experimental station established on swampy land at the Prins Bernhard Polder, to study all aspects of the mechanization of agriculture in Surinam. The experimental area is partly overgrown with swamp grasses, such as *Cyperus giganteus*, *Blechnum* sp., *Typha* spp., and by *Erythrina glauca*. Notes are given on work done on drainage, land reclamation, weed and pest control. Good control of *E. glauca* was obtained by spraying with a 10% solution of sodium arsenate.—P.J.B.

315 Fassetta, L. La irrigazione nelle bonifiche del Basso Piave. **[Irrigation in the reclaimed land of the Lower Piave (Italy).]** *Agricoltura d. Venezie* 1952, **6,** No. 7, 316-27.
Although the recently reclaimed land of the Lower Piave is mainly composed of deep, cool, clayey, organic soils, irrigation is often required during June to August for maize and sugar-beet. The problems concerning irrigation methods and costs, and the amounts of water required are discussed. The sprinkler or the furrow systems are the only ones suitable for this region.—E.B.O.

316 Montanari, V. L'irrigazione a pioggia nelle Venezie. **[Sprinkler irrigation in the Venetian regions.]** *Agricoltura d. Venezie* 1952, **6,** 102-15, illus.
Information is given on irrigation in the Venetian regions, particularly sprinkler irrigation which is being increasingly adopted and is practised on about 10% of the total irrigated area. Sprinkler irrigation is used on the following crops: potatoes, maize, fodder catch-crops, sugar-beet and hemp. The approximate increases in yield obtained by sprinkler irrigation from the various crops are given. The soils sprinkler-irrigated are mainly loose, gravelly or of medium consistency, but there are also some clayey or peaty soils. The quantity of water given varies from 300 to 350 cu. m. per ha. for each application. Three applications are generally given, sometimes more for particular crops. The advantages of this system, compared with other irrigation systems, are discussed. [From *Herb. Abstr.*]—E.B.O.

317 Lanza, F. Irrigazione per aspersione con acque titolate. **[Sprinkler irrigation with titrated aqueous solutions.]** *Publ. Roma, Sta. chim. agr. sper. 62* 1951, pp. 8, bibl. 1, French summary pp. 7-8.
This is an Italian report to the 2nd World Congress on chemical fertilizers held at Rome in October, 1951. Information is given on the fertilizer-sprinkler irrigation method. The relative importance of irrigation water and fertilizer varies according to the rainfall of the season in which treatment is given. The fertilizers applied by this method are: organic substances (town sewage, urine, and solutions of farmyard manure) and chemical fertilizers (mainly N fertilizers). The fertilizer irrigation is generally given as a top dressing to crops. The principal fertilizer-irrigated crops in Italy are the forage crops, but hoed crops and wheat are also fertilizer-irrigated on some farms. Beet and maize are irrigated with water containing 5 to 10% N fertilizers during spring-summer.—E.B.O.

SOIL AND WATER CONSERVATION

318 Patterson, R. H. **Interim report of arboricultural activities, vegetative development and research work carried out from April 1948 to July 1951 in the L.R.W. Project area, South Australia.** 1951, pp. II + 6, illus. Australia; Commonw. Dep. Works and Housing.
The main purpose of this enterprise is to introduce new vegetation comprising trees, shrubs, grasses, other perennials, vegetables and flowers, and to regenerate the existing flora of the area of the Long Range Weapons Project in the arid zone of South Australia. As well as making the area (mainly around Woomera) self-supporting in fresh vegetables, milk and meat, it is hoped that the enterprise will improve the environment for the workers there and also help to check soil erosion. Investigations are in progress on the suitability of certain trees, shrubs, grasses and crops which have been introduced from other countries with a similar climate (average rainfall approximately 5 to 8 in.). Among these, Russian rye and a species of dwarf saltbush, *Atriplex halimus*, from the dry, saline, areas of Portugal, are promising. The grain of Russian rye (nutritive value approximately 50% of Australian wheat) is used in the Baltic countries for making black bread and the threshed straw is stored for winter feed for cattle. *A. halimus* resembles *A. nummularia* (old-man saltbush) and has possibilities for arresting sand drift, in addition to its value as a fodder for sheep and cattle. The most promising grass species are *Pennisetum clandestinum* (Kikuyu grass), *Cynodon transvaalensis* (Florida couch), *C. dactylon* (common couch), *Cenchrus ciliaris* (Buffel grass), *Panicum maximum* var. *trichoglume* (fine stemmed Guinea grass), *Agropyron elongatum* and *Sporobolus* sp. Field experiments have been carried out on a limited scale to counter deficiencies in the soil by the use of organic and artificial fertilizers and trace elements.—K.L.

319 Tilt, J. and Berryman, J. W. **Outline of the problems associated with early oat growing on cropped-out areas of Cressy shaley clay loam.** *Tasm. J. Agric.* 1952, **23,** No. 3, 235-40.
A preliminary report is given of experiments with plots which had been 4 and 12 years, respectively, under pasture since last being cropped. The plots were fallowed and sown down to Algerian oats in February, 1952, in an endeavour to dis-

ver how long this soil must be under pasture
fore it recovers its nitrate content and its struc-
re, and, therefore, its ability to conserve mois-
re. Details of the rainfall, and of the cultiva-
on, growth and yields of the experimental plots
e given, together with suggestions as to how the
xt series of experiments may be improved.—
om authors' summary.

0 MOLFINO, R. H. and others. La fertilidad del suelo pampeano. **[The fertility of the soil of the pampa.]** *Rev. argent. Agron.* 1952, **19,** No. 2, 69-115, bibl. in text.

is symposium, although primarily a soil study,
ntains information necessary for any study of
this, the most important, grassland crop-production region of the South American continent. W. F. Kugler, in his introduction writes: " Ours [Argentina] is a country which exports fertility." R. H. Molfino outlines the problems faced. A. J. Prego, A. M. Offermann and M. J. R. Zafanella discuss soil fertility in its relation to water supplies, organic matter, and chemical elements respectively. Phosphorus deficiency is marked. Lime is disappearing rapidly. M. A. L. Reichart discusses measures for improvement.—G.M.R.

321 WILLIAMSON, T. W. **The reclamation of marginal chalk lands [in Great Britain].** *Pamph. Bath and West and Southern Counties Soc. 17* 1951, pp. 18.

WEEDS AND WEED CONTROL

2 FAO. Memo. No. 52/5/3036. **Combating *Imperata cylindrica* and *Cyperus rotundus.*** 1952, pp. 10, bibl. 70. [Rome]

review of the literature (covering the period
8-52) is given under heads which include (for
perata): protection from fire, mechanical
asures, herbicide treatments, and the growing
cover- or shade-crops; and for *Cyperus*: com-
ing by means of animals (specified as livestock,
s, poultry and insects), the planting of cover- or
other-crops, mechanical measures, burning or
ding, and the application of herbicides and
wth hormones. It is concluded that *Imperata*
be controlled by avoiding the use of fire as an
icultural practice, by tilling the soil and the
nting of shade- or cover-crops. The use of herbi-
es is effective, but they are too expensive for
e-scale application. With regard to *Cyperus*,
s concluded that some measure of control can
achieved by close grazing [details not quoted].
planting of vigorous cover crops gives tem-
ary control, whereas repeated deep cultivation
h intervening intervals for drying the tubers)
some cases gives complete eradication. Pro-
ed flooding is also effective. Repeated applica-
s of great quantities of various herbicides
licate nutgrass, but are too expensive. [From
b. Abstr.]—M.H.

ENGLAND AND WALES. Ministry of Agriculture and Fisheries. Adv. Leafl. 280. **Ragwort.** 1952, pp. 5, illus.

eneral account is given of the morphological
acters, occurrence and distribution in Great
ain of ragwort, *Senecio jacobaea*. The symp-
of ragwort poisoning in cattle and horses are
ribed. Methods for the control of ragwort
de: grazing with sheep, hand pulling, cutting
and burning, biological control and spraying with (a) growth-regulating herbicides MCPA and 2,4-D, or (b) sodium chlorate. The general rate of application of the hormone weedkillers is 3 to 4 lb. of the sodium or amine salts of 2,4-D or MCPA at 80 to 100 gal. volume per ac. and sodium chlorate at 30 to 50 lb. in a 100 gal. of water. Spraying should be done when the plants are in the early bud stage. Leys containing ragwort should not be sprayed in their first year of growth. The caterpillar of the Cinnabar moth in years of abundance will so defoliate ragwort plants that they are killed or severely checked. [From *Herb. Abstr.*]—K.L.

324 ENGLAND and WALES. Ministry of Agriculture and Fisheries. Adv. Leafl. 190. **The control of bracken.** 1952, pp. 7.

This leaflet summarizes available information on the methods and economics of bracken (*Pteridium aquilinum*) control in Great Britain. Control methods include: (1) ploughing from June to August, followed by disc harrowing and the sowing of a pioneer crop; (2) cutting, crushing or bruising by suitable implements; (3) crushing and trampling by stock; (4) chemical control (sodium chlorate has been the most successful agent). [See also *Herb. Abstr.* 22 : 702, 547 and 21 : 1187, 1186.] [From *Herb. Abstr.*]—K.L.

325 CONWAY, Elsie. **Bracken—the problem plant. A review of recent conclusions about its spread and dominance.** *Scot. Agric.* 1952, **31,** No. 4, 181-4, bibl. 6, illus. [Dep. Bot., Glasgow Univ.]

A general account of the life history and development of this plant, (*Pteridium aquilinum*), is given and recent conclusions on its spread, dominance and control (particularly in Scotland) are reviewed. [See also *Herb. Abstr.* 22 : 418.] [From *Herb. Abstr.*]—K.L.

326 MILNE HOME, Sir J. H. **Bracken control. A review of work done on the Buccleuch Estates [in Scotland].** *Scot. Agric.* 1952, **31,** No. 4, 184-9.

Each area of bracken-infested land was tackled separately and cut twice a year for the first 2 years. A single cut was taken in the third year, by which time the bracken plant was so weak as not to interfere with the pasture. A bracken-cutting machine in conjunction with hand-cutting by scythe was found to be the most successful method of controlling the bracken. A table of the costs per acre from 1946-51 showing the performance of the bracken-cutting machines used on the Buccleuch Estates is given. The performance of the individual machines varied widely because of mechanical breakdowns, the nature of the ground, etc. Cutting by scythe cost on average about 1s. 6d. per ac. more than by machine. [From *Herb. Abstr.*]—K.L.

327 TIMMONS, F. L. **India fights a land invader.** *Foreign Agric.* 1952, **16,** No. 5, 99-101, illus. [Weed Invest. Div., Plant Industr. Bur., U.S. Dep. Agric., Logan, Utah]

A note is given on current progress in clearing farmland in central India of Kans grass (*Saccharum spontaneum*), an aggressive, unpalatable, rhizomatous species of wild sugar-cane. This weed is a serious problem on the deep, silty-clay loams and black soils of north central India. Experience over the last 4 years has shown that repeated cultivations with blade harrows during the period November to June can completely control this weed.—P.J.B.

328 CORMACK, R. G. H. **A note on the dormancy of Tartary buckwheat seeds.** *Sci. Agric.* 1952, **32,** 170-2, bibl. 1, illus. [Bot. Dep., Alberta Univ., Edmonton]

Notes are given on the seed coat and germination of *Fagopyrum tartaricum*, a Canadian weed with a prolific seed production. Mature seeds did not germinate at the time of shedding. Seed dried for 10 to 30 days at a temperature of 25°C. had a low germination percentage, while that dried for 60 to 70 days germinated completely within 3 days after moistening. Seed kept damp for up to 60 days after shedding did not germinate, but where this treatment was followed by drying the seed for 30 to 70 days at a temperature of 25°C. germination was complete. Dormant seed germinated completely within the 3 days of removal of the seed coat, though removal of the pericarp, alone, did not permit germination.—P.J.B.

329 OYER, E. B. and others. **The seasonal development of Johnson grass plants.** *Proc. 8th N. Cent. Weed Control Conf. 1951* 1951, 62-3. [Purdue Univ. Agric. Exp. Sta., Ind.]

Critical studies were made of the seasonal development of Johnson grass (*Sorghum halepense*) grown under Indiana conditions. On seedling plants, rhizomes were first observed at the 7-leaf stage (50 days after sowing) and plants produced one, or several, rhizomes from axillary buds on the stem just below the soil surface. A moderate amount of rhizome development took place when the plants were in the boot stage at 66 days after sowing, by which time small branches were developing from the first-developed rhizomes. Rhizome growth continued vigorously from the boot stage until the seeds were beginning to mature, after which there was no further increase in the dry weight of rhizomes until the end of the growing season. The dry weight of the plants reached a maximum value when the seed was in the dough stage. At the time of maximum top growth, rhizome growth took place at an even higher rate than that of the top growth. In the case of plants propagated by rhizomes, seasonal growth was very similar to that of plants grown from seed, except that the development of new rhizomes took place earlier than in the case of the latter. [From *Herb. Abstr.*]—P.J.B.

330 NICKELL, L. G. and VRADENBURG, G. A. **454 weeds [in the USA] and how to control them.** *Plants and Gdns* 1952, **8,** No. 1, 58-111, bibl. 130.

Information on weed control published over the period 1947-51 is summarized in tabular form. The information on specific weeds includes their common and scientific names, the compound most suited to control them, brief notes on treatment and a bibliography of 130 items. A list is given of synthetic hormones and other chemicals used in the USA for weed control, classified by their commonest uses. Their trade and chemical names are given.—P.J.B.

331 COCK, R. E. **Some cruciferous weeds [in Tasmania].** *Tasm. J. Agric.* 1952, **23,** 174-7, bibl. 1, illus.

The three most common cruciferous weeds in Tasmania, *Sinapis arvensis* (charlock), *Raphanus raphanistrum* (wild radish) and *Brassica campestris* (wild turnip), are described. Chemical and cultural control methods are indicated. [From *Herb. Abstr.*] —K.L.

332 DUBUS, M. **Notes on weed control in France, with special reference to the treatment of young lucerne.** *Plant Prot. Overseas Rev.* 1952, **3,** No. 1, 24-5.

tisfactory results were obtained over 3 seasons in ance from the use of the sodium salt of MCPA groxone 10%) for weed control in oats under- wn with lucerne and clover. The herbicide s applied at the rate of 4 to 5 l. per ha. by high lume spraying (800—1200 l. of water) or by omization (80—100 l. of water). [From *Herb. str.*]—C.L.S.

3 RADEMACHER, B. Über die Lichtverhältnisse in Kulturpflanzenbeständen, insbesondere in Hinblick auf den Unkrautwuchs (Getreide, Hackfrüchte, Hülsenfrüchte, Futter-, Öl- und Faserpflanzen). [**Light in crop plant stands, with special reference to weed growth (cereals, roots, leguminous plants, forage, oil and fibre plants).**] *Z. Acker- u. Pflbau* 1950, **92,** No. 2, 129-65, bibl. 14. [Landw. Hochsch. Stuttgart-Hohenheim]

ith the aid of an instrument which is described, easurements of electromagnetic radiation within e wave region of 300 to 700 μμ (the most import- t for assimilation) were made in stands of the lowing crop plants: winter and summer wheat, nter and summer barley, oats, maize, beans *icia faba*), peas, lupins, a cereal-legume mix- re, lucerne, buckwheat, winter rape, flax, hemp, ppy, potatoes, fodder- and sugar-beet. The easurements were made at approximately 8-day ervals (a) at ground level within the stands and tside, and (b) at different heights within the nds, from the time the plants came up until they re harvested. It was thus possible through (a) determine the relative absorption of light and e course of shading at ground level at any stage of e crop's development, and this is expressed for e different plants in curves. The measurements enabled the diminution in absorption of light wards to be determined, and this is expressed in grams named "shadow cones," which facilitate mparison of the shading capacity of different crop nts for the control of the taller and climbing ed species. Results are discussed for each crop arately. The attention of plant breeders is wn to the value for weed suppression of shading crop plants: the breeding of short-strawed eal varieties is said to have had unfavourable ults in this respect. The depth to which light m the edge of a stand penetrates into the interior s tested in oats, *Vicia faba* and flax, and in every e was found to be not much farther than the uivalent of the height of the stand.—G.M.R.

MCCALL, G. L. **"CMU"; new herbicide.** *Agric. Chem.* 1952, **7,** No. 5, 40-2, 127 and 129. [E. I. duPont de Nemours and Co., Inc., Wilmington, Del.]

eview is given of the properties and uses of CMU (p-chlorophenyl)-1, 1-dimethylurea), a member of a new class of herbicides. CMU acts primarily through the roots of plants. Applications of from 20 to 80 lb. per ac. will kill grass and broad-leaved weeds, both annual and perennial. Amounts of from 1 to 10 lb. per ac. are sufficient to control a large range of annual weeds. CMU requires adequate rainfall to carry it down to the roots of plants. It is only slightly water-soluble and therefore persistent in action. In general, shallow-rooted plants require less CMU to achieve control than do deep-rooted plants. Plants such as couch (*Agropyron repens*) and Bermuda grass (*Cynodon dactylon*) may require 20 to 30 lb. per ac. of CMU, while Johnson grass (*Sorghum halepense*) and bindweed (*Convolvulus arvensis*) may require 40 to 60 lb. per ac. to achieve control. A rate of 1lb. per ac. of CMU will control most annual weeds for a period of 6 to 8 weeks; 12lb. per ac. has kept soil clear of all vegetation for up to 12 months. With certain large-seeded crops, a pre-emergence, low dosage application of CMU is lethal enough to kill germinating weed seeds, but not lethal enough to affect the crop seed.—P.J.B.

335 MUZIK, T. J. and CRUZADO, H. J. **Increase in herbicidal activity of sodium trichloroacetate when combined with some contact herbicides.** *Agron. J.* 1952, **44,** No. 7, 383-4, bibl. 5.

Pentachlorophenol, di-nitro-secondary-butyl phenol, various aromatic oils and di-isopropyl dixanthogen (DD) each increased the herbicidal effect of sodium trichloroacetate (TCA) against mature weed-grasses. DD and TCA was the most effective combination. On trial plots, the effect on Bermuda grass (*Cynodon dactylon*) and Para grass (*Panicum purpurascens*) of TCA alone and of TCA and DD combined was investigated. The combined herbicides were significantly more effective than TCA alone at rates of 30, 60 and 100 lb. per ac. of TCA on Bermuda grass and at the rate of 30 lb. of TCA on Para grass. The use of TCA in combination with aromatic oil and 2,4-D is also discussed.—W.J.B.

336 JANSSON, S. L. and others. Fält och lysimeterundersökningar angaende natriumklorat som ogräsbekämpningsmedel. [**Field and lysimeter studies on sodium chlorate as a herbicide.**] *Medd. LantbrHögsk. 35* 1951, pp. 109, bibl. 14, English summary pp. 107-9.

The results are given of extensive field trials in Sweden during 1944-9 on the use of sodium chlorate as a herbicide in field crops. Among the problems studied were the following: (a) the amounts to apply and the times of applying sodium chlorate, (b) its herbicidal effect on different weeds, (c) its effect on different crops, (d) the effect of different soils and climatic conditions on its herbicidal action, (e) the effect of nitrate N on the toxicity of sodium chlorate in the field, and (f) the effect of autumn cultivations on its toxicity. The phytotoxic effect of sodium chlorate appeared to be due to its breaking-down in the plant into a number of products, among which the hypochlorites seemed to be the most toxic. With regard to climate, rainfall during October and November appeared to be a ruling factor in leaching the herbicide from the soil. Where the average monthly rainfall during these two months was less than 100 mm. sodium chlorate seriously affected sensitive crops, such as spring wheat, spring barley, summer rape, sugar-beet and fodder-beet. The risk of toxicity to following crops was considerably less on light than on heavy soils, but even on light, well-drained soils applications of 100 and 200 kg. of sodium chlorate during the preceding autumn caused a severe, early set-back in growth to sensitive crops. To control thistle and couch grass (*Agropyron repens*) applications of 200 kg. per ha. of sodium chlorate were necessary, a quantity entailing serious risks to subsequent crops, particularly in the relatively dry areas of eastern Sweden. Sodium chlorate treatment early in the season appeared to have a better herbicidal effect and to be less toxic to subsequent crops than did treatment in autumn. Compared with cereal crops, linseed, peas and potatoes appeared to be much less sensitive to sodium chlorate injury ; applications of up to 200 kg. per ha. did not appear to have any significant effect on the quality of either of these crops, or of the aforementioned sensitive crops. Sodium chlorate appeared to have a greater effect on the vegetative development than on the seed set and grain yield of cereal crops. From the results of these trials, no recommendations can be laid down for the use of sodium chlorate as a herbicide, without risk to subsequent crops. In laboratory trials, the application of nitrates to soils treated with sodium chlorate reduced its phytotoxic effects, but these findings have not been borne out in the field. It is concluded that the use of sodium chlorate for weed control in general agriculture is too risky and too expensive to be recommended, though it may be of value for spot applications to weed-infested patches in fields.—P.J.B.

337 RADEMACHER, B. and FLOCK, A. Untersuchungen über die Anwendung von Kalkstickstoff und Feinkainit gegen die Ackerunkräuter der Lehm- und Sandböden. [**Investigations on the use of calcium cyanamide and fine kainit for the control of field weeds on loam and sand soils.**] *Z. Acker- u. Pflbau* 1951, **94**, No. 1, 1-54, bibl. 66. [Landw. Hochsch. Stuttgart- Hohenheim, Germany]

Pot and field trials were made from 1937-9 and from 1945-50. A full account is given of the diverse behaviour of 69 weed species at different stages of their development under applications of calcium cyanamide, kainit, and mixtures of these two. The technical and biological advantages of such mixtures are discussed.—G.M.R.

338 STRYCKERS, J. Herbiciden of onkruidverdelgers. [**Weedkillers.**] *British Council Course No. 110 on Insecticides and Weedkillers.* 1951, pp. 110, bibl. in text, English summary pp. 96-7. [Agric. Coll., Ghent, Belgium]

An account is given of a course on insecticides and weedkillers which was held in England in the summer of 1951. The course was concerned rather with the development of materials and the methods of assessing their relevant properties than with the method of application in the field, although some of the latest equipment was seen at work. The present account includes Flemish versions and summaries of several of the papers presented, together with the relevant bibliographies, and is divided into 5 main sections, namely, research on weeds in England ; selective toxicity and action of the selective herbicides ; the determination of phytotoxicity; the action of the principal groups of herbicides (synthetic growth substances, nitro-phenols, and petroleum derivatives) ; and new processes of selective weed control. Indexes are given of authors and research workers, herbicides, cultures and weeds. A glossary of English, scientific, and Dutch names of weeds (pp. 94-5) is also presented.—G.M.R.

339 HINKLE, D. A. and others. **Chemical weed control. 1951 screening experiments.** *Rep. Ser. Arkans. Agric. Exp. Sta. 31* 1952, pp. 32, illus.

The results are given of weed-control trials in cotton, soyabean and maize crops at 3 locations in Arkansas. The trials with cotton included the use of pre-emergence herbicides, post-emergence treatment with oils and a combination of both. Under dry conditions following sowing, 2 lb. per ac. of oil-soluble DNOC applied as a 10 in. band over the rows gave satisfactory weed control. The application of a pre-emergence herbicide, such as DNOC, or pentachlorophenol, followed by 2 post-emergence applications of oil was more satisfactory in terms of injury to the cotton, than were 3 post-emergence treatments with oil. Chloro IPC appeared promising for weed control in cotton when used for either pre-emergence, or post-emergence treatment. With soyabeans, pre-emergence treatment with 1.5 lb. per ac. of water-soluble DNOC applied as a 10 in. band over the rows gave good weed control and was not as toxic to the crop as similar treatment with 1.5 lb. per ac. of oil-soluble DNOC. Two directed spray treatments with Lion Herbicidal Oil No. 1 at a rate of 5 gal. per ac., 24 days after soyabean emergence, gave excellent weed control

nd did not injure the crop. Pre-emergence treat-
ent of maize with 1.5 lb. per ac. of water-soluble
NOC gave good weed control.—P.J.B.

40 MARSH, R. W. **Herbicides and systemic fungicides.** *Nature, Lond.* 1952, **169,** No. 4307, 814-16.

n account is given of papers delivered to a joint
eeting (held in London on 14 March, 1952) of the
ssociation of Applied Biologists and the Crop
rotection Panel of the Society of Chemical
dustry. [From *Herb. Abstr.*]—M.H.

1 FROMM, F. **A quantitative evaluation of the *Lemna* test for herbicides.** *Bot. Gaz.* 1951, **113,** 86-90, bibl. 12, illus. [Mount Mercy Coll., Pittsburgh 13, Pa.]

here is great diversity in the manner of expressing
e concentration of herbicides. This adds to the
fficulty of comparing results from different
servers. The author advocates standardization
units and suggests that concentration should be
pressed in molarity, volume in litres and treated
ea in square metres. The term "phytocidal
dex" is proposed for the quotient of molarity of
e active solution over the number of square
etres which can be effectively controlled with 1
re of this solution. *Lemna minor* has been
ed for the practical evaluation of herbicides.
The limiting lethal concentration for this plant
5 × 10^{-3} *M* $NaClO_3$, 10^{-3}*M* NH_4CNS or NH_4O_3
H_2, and 5 × 10^{-5} *M* 2,4-D. . . From examina-
n of reported effective concentrations in the
erature, the phytocidal index for annual weeds
seems to be about one hundred times the limiting lethal concentration." [From *Herb. Abstr.*]—D.B.

342 RIEPMA, P. Grensvlakverschijnselen en selectiviteit bij de chemische onkruidbestrijding. **[Variations in droplet/plant contact area and selectivity in herbicidal weed control.]** *Landbouwk. Tijdschr.* 1952, **64,** 387-93, bibl. 28. [Cent. Inst., Landbouwk. Onderz., Wageningen, Netherlands]

A review is given of basic theoretical considerations of the contact between herbicides and plant surfaces, with particular reference to the relation between herbicidal selectivity and the concentration of the herbicide, its period of action, the area of herbicidal droplet in contact with the plant surface and the angle of the droplet surface and the plant surface.—P.J.B.

343 UNITED STATES. North Central Weed Control Conference. **Research Report of 8th Annual Meeting, 1951.** 1951, pp. 183.

This report is divided into the following main sections: (a) control of perennial herbaceous weeds, (b) control of annual, winter annual and biennial weeds, (c) control of weeds in field crops, (d) control of weeds in potatoes, sugar-beet and horticultural crops, (e) new herbicides, (f) control of woody plants, (g) mechanical considerations in weed control, (h) fundamental studies with herbicides. Each section contains a summary of the work reported, together with abstracts, submitted by a total of some 150 workers. [From *Herb. Abstr.*]—P.J.B.

CROP BOTANY

4 PRAT, H. **Microcalorimetric studies on germinations of cereals.** *Canad. J. Bot.* 1952, **30,** No. 4, 379-94, bibl. 15. [Biol. Inst., Montreal Univ., Montreal, Quebec, Canada]

e results are given of experiments carried out on
e seed of wheat, oats, barley, rye, maize and
x, using a Tian-Calvet microcalorimeter to
termine thermogenesis in germinating seed, as
ected by temperature, previous dehydration of
e seed and different substances in the soaking
id. The respective germinating thermogenesis
the different crop seeds is compared and a note
en on the use of such thermogenic determina-
ns in the study of seed germination.—P.J.B.

5 PIUNOVSKII, B. A. **[Salinity tolerance of agricultural crops.]** [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* (*Proc. Lenin Acad. agric. Sci.*) 1952, **17,** No. 4, 18-24, bibl. 12. [Moscow Inst. Hydrotech.]

Germination in saline solutions of seeds of different varieties of wheat and cotton disclosed widely differing saline tolerance in individual varieties of the same crop. With similar concentrations, sulphate-chloride salinization, characteristic of the Hunger Steppe, has a decidedly more deleterious effect on germination than chloride-sulphate salinization, characteristic of Fergana. The relative saline tolerance of seed of different varieties of cotton can vary according to the character of salinization. Saline tolerance of agricultural crops depends not only on species and variety, but also on the place of origin of the seeds. In order to increase yields on saline soils it is necessary to sow seeds of local provenance.—R.P.J.

346 JOHNSTON, H. W. **Technique for obtaining aseptic seedlings.** *N.Z.J. Sci. Technol.* 1952, **33,** Sect. A, No. 6, 87-91, bibl. 3, illus. [Soil Bur. Dep. Sci. Industr. Res., Wellington]

The apparatus described allows the separate processes of surface decontamination, washing with sterile water, and subsequent treatment with the desired sterilizing agent to be carried out without the ingress of non-sterile air to the apparatus. The equipment has been found suitable for seed sterilization and the production of sterile seedlings of the following plants: lupin, 1% Aretan for 1 hr.; oats (with the husk removed), 1% Aretan for 1 hr.; oats (with the husk removed), 6.6% CaOCl for 20 min.; wheat, 6.6% CaOCl for 20 min.; mustard, 0.25% $HgCl_2$ for 2 min. [From *Herb. Abstr.*]—M.H.

347 BALL, E. **Morphogenesis of shoots after isolation of the shoot apex of *Lupinus albus*.** *Amer. J. Bot.* 1952, **39,** 167-91, bibl. 23, illus. [Agric. Exp. Sta., Univ. N. Carolina, Raleigh]

Shoot apices were isolated by four longitudinal cuts and the shoots produced by these meristems were followed through their growth to maturity. The immediate result of the operation is an unique situation in which considerable information on the growth of this plant may be obtained. There is obtained by this experiment a shoot apex at the top of a " stem " consisting entirely of pith; the shoot apex has no foliar primordia and there is no subjacent vascular system. It was therefore possible to obtain some information toward answers to the following questions: Are there anatomical evidences of the production by the shoot apex of chemical substances determining vascular tissues? Is procambium necessary for transport of substances from the shoot to the shoot apex, and vice versa? Is procambium produced under the influence of the shoot apex, or under that of the subjacent, mature tissues? How are the cortex and epidermis formed? What relationship is there between phyllotaxis of original shoot and that of the new shoot? How is the stimulus to bud inhibition transported? Is the vascular system exclusively foliar, or partially cauline? [From *Herb. Abstr.*]—From author's summary.

348 ZIERIACKS, H. Über Blüteninduktion durch Keim- und Primärblätter. [**Flower induction by cotyledonary and primary leaves.**] *Biol. Zbl.* 1952, **71,** 210-38, bibl. 37, illus. [Univ. Göttingen, Germany]

The influence of the leaf in floral induction is already well established, but, since leaves at different stages of development (cotyledonary, primary and foliage leaves) have a different morphological form, their separate influence was investigated. All leaves, except one or two of the cotyledonary leaves, were removed from plants of 11 species as early as possible. Most of the species, which included *Helianthus annuus*, *Phaseolus vulgaris*, *Ph. multiflorus* and *Sinapis alba*, when under photoperiodic treatment, were able to produce inflorescences with the help of only cotyledonary leaves. The capacity to induce flower formation is evidently not limited to any particular type of leaf. On the other hand two plants, *Rudbeckia bicolor* and *Kalanchoë blossfeldiana*, did not produce flower until the primary leaves had reached a certain minimum size (100 mm.^{2}). Some of the defoliated plants which were investigated developed abnormal flowers, their floral organs being leaflike, while strongly defoliated plants showed symphisis of floral parts. It is probable that, for each species, a minimum leaf surface is required for normal floral development. [From *Herb. Abstr.*]—D.B.

349 EHRENBERG, P. Verbesserungsmöglichkeiten der Klimabedingungen beim Vegetationsversuch. [**Possibilities of improving the climatic conditions of plant growth trials.**] *Z. Acker- u. Pflbau* 1951, **94,** No. 1, 55-9. [Weihenstephan]

The subject is discussed, with special reference to water supplies in pot trials, on the basis of a book recently published by Brouwer [W. Brouwer, *Die Feldberegnung*. Stuttgart and Ludwigsburg: Verlag Eugen Ulmer, 1950, pp. 171].—G.M.R.

350 TOMBESI, L. Il metabolismo dei vegetali e le disponibilità idriche del suolo. Nota 1. Modulo enzimatico e coefficiente ossidasico. [**Plant metabolism and the water availability in the soil. Note 1. Enzymatic pattern and oxidase coefficient.**] *Publ. Roma, Sta. chim.-agr. sper.* 67 1951, pp. 28, bibl. 9, illus., English summary pp. 27-8.

An account is given of investigations carried out with sugar-beet and other crops. [See also *Fld Crop Abstr.* 3 : 1494 and 1495, 4 : 104 and 5 : 595.]—E.B.O.

351 POHJAKALLIO, O. **On the effect of the intensity of light and length of day on the energy economy of certain cultivated plants.** *Acta agric. Scand.* 1951, **1,** 153-75, bibl. 16. [Plant Path. Inst., Helsinki Univ., Finland]

Studies were made of the energy economy, as indicated by dry-matter production, of the following species: *Solanum tuberosum*, *S. demissum*, *S. tuberosum* × *S. demissum*, a German *Solanum* hybrid named Aquila, spring wheat, spring barley, spring oats and pea. These species were grown in north and south Finland, between latitudes 60° and 69°, in photoperiods from 10 to 24 hr. in north Finland and from 10 to 18 hr. in south Finland. The average production of dry matter of the spring cereals was most intense during the first 10 hr. of illumination. The relative dry-matter yield of shoots per unit of time between the 17th and 24th hr. of illumination decreasing to about 50% of that during the first 10 hr.; root growth tween the 17th and 24th hr. of illumination was most nil. With a 7 hr. photoperiod, root growth as greater and total dry-matter production at ast as great as that in continuous light. The fect of day length on peas was very similar to at on the spring cereals. There were wide variaons in the response of the different species of otato to photoperiod. *S. demissum* formed no bers in normal day lengths of 17 to 18 hr., while ber formation was considerable in 10 hr. photoriods. The Harbinger variety of *S. tuberosum* rmed as many tubers in 10 hr., as in 18 hr. photoriods, though top formation was much greater the 10 hr. than in the 18 hr. photoperiod. The oportion of the plants represented by the underound parts was little affected by day length ere light intensities were low. Increases in ht intensity at given day lengths, increased the oduction of dry matter in the roots more than at in the above-ground parts of the plants. The sponse of the underground parts of the plants to ht intensity at given day lengths appeared to be e ruling factor in the sufficiency of the total ount of luminous energy for the energy economy quirements of the plants grown at different latides.—P.J.B.

2 NIELSEN, H. M. **Effect of hormone derivatives on cultivated plants. III. Reaction of various cultivated species to 2,4-D and 4K-2M.** *K. VetHøsjk. Aarsskr.* 1951, 108-56, bibl. 28, illus.

e results are given of trials in Denmark during 47-50 to determine the effect of different applicaons of 4K-2M Na salt (Agroxone and Dicotox) d 2,4-D (Herbatox and Herbatox D) on a numr of crop species. The order of sensitivity to the rbicides was as follows, starting with the most sistant : (a) barley and grass species, (b) maize, seed and potatoes, (c) grassland legumes, (d) peas, ppy and fodder vetch, (e) fodder-beet, chicory, oin and broad bean, (f) mustard, swede and rnip. The relatively resistant species, such as rley, maize, linseed and potatoes, were sprayed th 0.25, 1, 4 and 16 kg. of herbicide per ha., while remainder were treated with 0.125, 0.25, 1 and kg. per ha. Where the effect of 16 kg. of herbile on barley and grass yields was taken as the rm, the same herbicidal applications were about 0 times as phytotoxic to mustard, 200 times as xic to fodder-beet and broad bean ; 100 times as xic to pea and poppy and 10 times as toxic to seed, maize and potatoes. The yield of many ecies, particularly barley, appeared to be slightly mulated by the lowest application of the herbiles. In small doses, 4K-2M appeared to be less ytotoxic than 2,4-D, while in the case of heavy plications, this effect was reversed. In further als, 2 dates of herbicide treatment were used. 1948, the crops were sown on 13 and 14 April and, in the case of root crops, potatoes and mustard, spraying dates were 1 and 14 June, and, for other species, 19 May and 8 June. In 1949, sowing dates were 3 and 4 May, the first spraying date for barley and flax was 3 June and for the remaining crops, 9 June, the second spraying date was 22 June, in all cases. In 1948, the spraying at the second date caused more injury to plants than did spraying at the first date, while in 1949, the opposite effect was noted. The difference in development of the plants was not great, but sufficient markedly to affect the phytotoxicity of the herbicides. In 1948, growing conditions were good, particularly at the second date of spraying, while in 1949 growth was retarded at the times of spraying by dry conditions. A summarized account is given of abnormalities in crop species sprayed with 2,4-D and 4K-2M.—P.J.B.

353 CASIDA, J. E. and ALLEN, T. C. **Absorption and translocation of insecticides by plants.** *Agric. Chem.* 1952, **7,** No. 6, 41-3, 135 and 137, bibl. 4. [Wis. Univ., Madison]

Notes are given on the absorption and translocation of a range of different types of insecticides within plants, including fumigants, oils, inorganic compounds and natural and synthetic organic compounds.—P.J.B.

354 SMITH, L. **The effect of atomic bomb-induced radiations on higher plants, particularly cereals.** *Oregon State Coll. Biol. Colloquium* 1951, 20-4, bibl. 10. [Wash. Agric. Exp. Sta., Pullman]

The effect of radiation on plants is discussed from the standpoints of : (a) injury, (b) reputed beneficial effects, (c) mutations, (d) chromosomal aberrations.—P.J.B.

355 DE WIT, C. T. and TALSMA, T. De bepaling van de werkzaamheid van wortels met behulp van radio-actieve isotopen. [**The determination of the activity of roots by the use of radio-active isotopes.**] *Landbouwk. Tijdschr.* 1952, **64,** 398-9. [Lab. voor Natuur- en Weerkunde, Wageningen, Netherlands]

A note is given on the use of radioactive P for determining the activity of the roots of plants. The method described takes only a short time to carry out and is of value in combination with normal root investigations. [From *Herb. Abstr.*]—P.J.B.

356 WHITTINGHAM, C. P. **The chemical mechanism of photosynthesis.** *Bot. Rev.* 1952, **18,** 245-90, bibl. 126. [Bot. Sch., Univ. Camb.]

357 BERGH, H. **Determination of the amino acids, cystine, methionine, tyrosine, and tryptophane in animal and vegetable materials.** *Acta agric. Scand.* 1952, **2,** No. 2, 158-72, bibl. 81. [State Agric. Lab., Trondheim, Norway]

The methods described are designed to give rapid routine determinations and are particularly suitable for the mixed proteins found in plant and animal material.—P.J.B.

358 BIDWELL, R. G. S. and others. **Paper chromatography of sugars in plants.** *Canad. J. Bot.* 1952, **30,** 291-305, bibl. 11. [Queen's Univ., Kingston, Ontario]

A chromatographic procedure for the qualitative and approximate quantitative estimation of sugars and phosphates in plants is described. The results of determinations of the soluble sugar and phosphate content of 27 families of *Spermatophyta* are given. Studies were made of the changes in the soluble sugars and phosphates in detached wheat leaves held in darkness, after they had been held in light, or darkness, for different periods while still attached to the plant. The changes in the content of different sugars in the leaves were paralleled by the content of different free and organic phosphates, indicating the existence of a balance between sugars, free phosphates and organic phosphates on the one hand and insoluble phosphates and " sugar sources " on the other. The physiological changes in the leaves as shown by gains or losses of sugar following different periods of light and darkness imply a change in phosphate metabolism. During the prolonged starvation of detached wheat leaves held in darkness, both organic and inorganic soluble phosphates accumulated after 2 days from the start of the starvation period, indicating the breakdown of some insoluble forms of phosphate ; free sugars had completely disappeared by this time.—P.J.B.

359 LAL, K. N. and SUBBA RAO, M. S. **Role of manganese in crop production.** *Sci. and Cult.* 1951, **16,** 553-8, bibl. 30. [Plant Phys. Lab. Coll. Agric. Banares Hindu Univ.]

360 DE JONGHE, P. and VAN DEN HENDE, A. Over snelle en nauwkeurige methodes voor de bepaling van minerale bestanddelen in plantenmateriaal. Tweede mededling. De bepaling van chloriden en phosphaten. [**A critical study of rapid and accurate methods for the determination of mineral constituents in plant material. Second communication. The determination of chlorides and phosphates.**] *Meded. LandbHoogesch. Gent* 1951, **16,** 298-311, bibl. 3, English summary p. 310.

In a previous communication, studies of different methods for determing K, Na, Ca and Mg in solubilized plant material were reported. This communication examines the application of the methods described to the determination of chlorides and phosphates. [From *Herb. Abstr.*]—P.J.B.

361 DESAI, S. V. and SUBBIAH, B. V. **Nitrification in relation to cation absorption by plants.** *Proc. Indian Acad. Sci.* 1951, **34,** No. 2, 73-80, bibl. 20. [Indian Agric. Res. Inst., New Delhi.]

The solvent which can possibly explain the increased availability of the mineral constituents to the plants appears to be the nitric acid from the nitrification process that goes on in all ordinary soils. Nitrate appears to have a definite *rôle* in the absorption of cations. The chemical composition of a number of plants indicates that there is a close relationship between nitrogen and cations absorbed (Ca + K + Mg + Na). [From *Herb. Abstr.*]—From authors' summary.

362 VALANTIN, G. and others. Méthodes analytiques appliquées au diagnostic foliaire. [**Analytical methods applied to foliar diagnosis.**] *Oléagineux* 1952, **7,** 363-5, bibl. 3, illus.

The Institut de Recherches pour les Huiles et Oléagineux [IRHO] has, since 1949, adopted the method of foliar diagnosis for determining the nutritive deficiencies and the fertilizer requirements of crops, as this method has appeared to be the most precise and rapid. The IRHO has introduced it into tropical Africa, particularly for groundnut studies. An account is given of the analytical methods employed there for determining the mineral elements in plant tissues, particularly the use of the Beckman spectrophotometer.—E.B.O.

363 BURTON, J. C. and others. **The prevalence of strains of *Rhizobium phaseoli* in some midwestern soils.** *Proc. Soil Sci. Soc. Amer.* 1952, **16,** 167-9. [Bacter. Dep., Wis. Univ., Madison]

Studies were made of : (a) the occurrence of effective and ineffective strains of *R. phaseoli* in soils from Michigan, Minnesota, Wisconsin and Louisiana, (b) whether the type of nodulation produced by selected isolates was correlated with N-fixing efficiency, and (c) whether strains isolated from the same nodule varied in efficiency and cultural characteristics. The results indicated that strains with significantly different symbiotic properties did not exist in the same nodule, though *Rhizobia* isolated from different nodules on the same plant varied significantly in this respect. Of 85 isolates of *Rhizobia*, 12 were effective, 59 moderately effective, and 15 were ineffective. *Rhizobia* were not abundant in any of the soils used.—P.J.B.

64 NOWOTNY-MIECZYŃSKA, A. Wpływ niektórych czynników na pigmentacje brodawek roślin motylkowych. **Some factors influencing the pigmentation of nodules of leguminous plants.** *Acta Microbiol. polonica* 1952, No. 1, 42-51, bibl. 9, Russian and English summaries pp. 50-1.

t was the aim of present investigations to find the ffect of CoCl$_2$ and ascorbic acid on the production f haemoglobin in root nodules and on the energy f symbiotic nitrogen-fixation. The solutions of oCl$_2$ and ascorbic acid in suitable concentrations were added to the cultures of *Rhizobium* before the inoculation or directly to plants already inoculated (peas, serradella and lucerne). It was found that these substances prevented the red pigment from turning green, without influencing in any way the energy and duration of nitrogen-fixation by the plants investigated. There was no close correlation between the amount of red pigment in root nodules and the energy of fixation. To elucidate this problem more trials are needed.—Author's summary.

MISCELLANEOUS

65 ENGLAND and WALES. Ministry of Agriculture and Fisheries. Adv. Leafl. 247. **Seed testing for farmers.** 1952, pp. 6.

nformation is given on sampling, purity and ermination of seeds ; injurious weed seeds ; the ork of the Official Seed Testing Station, Camridge ; and the regulations of the Seeds Act, 920.—K.L.

56 JUSTICE, O. L. **The testing for purity and germination of seed offered for importation into the United States.** *Proc. internat. Seed Test. Ass. Rep. 9th Congr., Copenhagen, 1951* 1951, 156-72. [Seed Act Div., Grain Branch, Prod. and Markets Adm., U.S. Dep. Agric., Washington, D.C.]

review is given of certain procedures for seed esting adopted by the Federal Laboratories of the SA, with particular reference to certain differences etween the procedures recommended in the Interational Rules for Seed Testing and by other overnments which may lead to the rejection of seed amples consigned to the USA. It is felt that the nternational Rules might be improved if certain of ne procedures discussed in this paper were inorporated at their next revision. [From *Herb. bstr.*]—P.J.B.

57 WELLINGTON, P. S. **Variation in purity analysis resulting from differences in technique and interpretation.** *J. nat. Inst. agric. Bot.* 1951, **6**, No. 1, 67-71, bibl. 4.

sing seed of cocksfoot (*Dactylis glomerata*), a reliminary investigation was carried out to obtain n estimate of the variation due to random sampng and other causes in the purity tests carried out y 33 private seed testing stations licensed under ne Ministry of Agriculture, and by the Official eed Testing Station. The mean percentage purity esults of certain stations tended to show a higher ercentage of pure seed than that obtained by the fficial Seed Testing Station. In one-third of the esults this difference is greater than can be explained by variation due to random sampling. There was a positive correlation between those stations obtaining a significantly lower percentage of inert matter than the standard and those obtaining a significantly higher mean percentage purity. Attention is drawn to the method of estimating the inert matter fraction as defined by the rules of the International Seed Testing Association and the Official Seed Testing Station whereby light seed is separated by aspiration in a seed blower and each floret so obtained is visually examined over transmitted fluorescent light and against a dark background. [From *Herb. Abstr.*]—C.L.S.

368 CANADIAN Seed Growers' Association. Circ. No. 6. **Regulations for the production of registered seed.** 1952, pp. 32. [Ottawa]

This is a revised edition and supersedes all previous issues of Circular No. 6. It includes a list of general and specific regulations for the seed production in Canada of cereals, open-pollinated and hybrid maize and sunflowers, and root crops.—P.J.B.

369 GADD, I. **Biochemical tests for seed germination.** *Proc. internat. Seed Test. Ass. Rep. 9th Congr., Copenhagen, 1951* 1951, 235-53, bibl. 57. [Stat. Frökontrollanst., Stockh., Sweden]

A review is given of the more important literature on rapid, biological methods of seed testing. In the author's view, such methods of testing seed are not yet sufficiently accurate to justify their replacing the conventional germination tests now in use, though they be may of value in the case of forest- and fruit-tree seeds which germinate very slowly. Again, biological methods require more time to test given samples than do the conventional methods, need highly trained personnel, and are difficult to carry out on small-seeded species. [From *Herb. Abstr.*]—P.J.B.

370 Proceedings of the International Seed Testing Association. **Recent literature 1940-1948.** *Proc. internat. Seed Test Ass.* 1952, **17,** No. 1, 52-133.

An exhaustive list is given of the titles of papers appearing during 1940-8 on: the botany and chemistry of seeds; seed-borne diseases; seed treatment; judgement of seed; seed selection; seed testing; seed control; regulation and distribution. Where possible, references are given to the abstract journals in which abstracts of these papers have appeared.—P.J.B.

371 Tombesi, L. and others. Attività ossidasica, catalasica, carboanidrasica, perossidasica e contenuto in glutatione ridotto ed acido ascorbico nel corso della maturazione di frutti e semi. Nota 1. [**Oxidase, catalase, carboanidrase and peroxidase activities and reduced glutathione and ascorbic acid content during fruit and seed maturation. Note 1.**] *Publ. Roma, Sta. chim.-agr. sper. 69* 1951, pp. 18, bibl. 10, illus., English summary pp. 16-17.

These investigations were carried out with seeds of kidney bean (*Phaseolus vulgaris*) and wheat (*Triticum vulgare* var. Roma), amongst other crops.—E.B.O.

372 Cox, H. C. and Lilly, J. H. **Effects of Aldrin and Dieldrin on germination and early growth of field crop seeds.** *J. econ. Ent.* 1952, **45,** No. 3, 421-8, bibl. 5. [Iowa State Coll., Ames]

The trials described were carried out with buckwheat, maize, flax, oat, rye, honey sorghum, soyabean and winter wheat plants grown in boxes in the greenhouse. The insecticides tested were Aldrin equivalent, recrystallized Aldrin and Dieldrin, all in 25% wettable powder formulations. In most cases Aldrin equivalent and Dieldrin were used at the levels of 0, 2, 4, 8, 16, 32, 64 and 128 lb. of technical insecticide per acre. Results from the trials showed that with Dieldrin there was good emergence and seedling growth at all levels, while with Aldrin equivalent there was good emergence and growth in most cases with the exception of some crops which gave poor development at the higher levels. Some of the insecticidal treatments improved the percentage germination of winter wheat and maize. There was evidence of slight growth stimulation by both Aldrin and Dieldrin, when used at 2 and 4 lb. per acre, on several of the crops tested. Certain growth defects were noted on some of the crops in addition to stunting, which was in part reflected in the green weight data. Honey sorghum was used as an indicator plant to determine whether Aldrin or the active materials associated with it in commercial preparation of Aldrin equivalent are phytotoxic. It was found that the associated materials were most phytotoxic, i.e., much better germination and growth were obtained with recrystallized Aldrin than were obtained with Aldrin equivalent at the same levels. Since even the level of 2 lb. per acre used in these experiments is higher than that usually applied for soil treatment, these insecticides appear to have a high margin of safety so far as phytotoxic effects are concerned on mid-western field crops, with the exception, possibly, of sorghum.—E.B.O.

373 Zimmerman, P. W. and others. **Detection and determination of 2,4-D as a contaminant by biological methods.** *Contr. Boyce Thompson Inst.* 1952, **16,** No. 10, 439-49, bibl. 7, illus.

Amounts of 2,4-D as low as 0.0001% were detected in materials applied to cotton and tomato plants as aqueous solutions, vapours, and in lanolin pastes. Leaf modification was the most sensitive response. A list is given of species of herbaceous weeds and cultivated annual and woody plants which exhibit leaf modification following exposure to sub-lethal doses of 2,4-D. Insecticides, such as DDT, Parathion and Toxaphene contaminated with 2,4-D, induced the same response in tomato and cotton plants as did similar concentrations of 2,4-D by itself.—P.J.B.

374 Leopold, A. C. and Klein, W. H. **Maleic hydrazide as an anti-auxin.** *Physiol. Plant.* 1952, **5,** 91-9, bibl. 21. [Purdue Agric. Exp. Sta., Lafayette, Ind.]

The studies reported were made to provide further information on the anti-auxin activity, in plants, of maleic hydrazide. In standard pea-growth tests, maleic hydrazide inhibited growth at concentrations as low as 0.1 mg. per 1. This growth-inhibiting effect could be completely countered by auxin; conversely, growth inhibition by high concentrations of auxin was relieved by the addition of maleic hydrazide, independently of any pH changes. There was no evidence that maleic hydrazide acted as an anti-auxin by combining with auxin *in vitro*.—From authors' summary.

375 Fransen, J. J. La absorción de Parathion por las plantas. [**The absorption of Parathion by plants.**] *Bol. Prod. Fom. agríc.* 1951, **3,** No. 27, 16-18.

Parathion, one of the most toxic insecticides, is also dangerous to man and domestic animals. Its absorption by plants through, (a) the roots (this danger appears to be less in proportion as the plant matures), (b) the cuticle, and (c) the stomata is discussed on the basis of experiments made by the author and by American and German workers. —G.M.R.

76 UNTERSTENHÖFER, G. Über das innertherapeutische insektizid Systox. [**Observations on the systemic insecticide Systox.**] *Meded. LandbHoogesch. Gent* 1952, **17,** No. 1, 75-87, English summary p. 87.

note is given on the mode of absorption and ranslocation of Systox within plants.—P.J.B.

77 GAINES, J. C. and MISTRIC, W. J. **Effect of environmental factors on the toxicity of certain insecticides.** *J. econ. Ent.* 1952, **45,** No. 3, 409-16, bibl. 4. [Tex. Agric. Exp. Sta., College Station]

aboratory and field cage tests were carried out in 951 to study mainly the effect of sunshine, dew and ain on the toxicity of several insecticides. mongst the insects used were the boll weevil, *nthonomus grandis*, and the cotton leaf-worm, *labama argillacea*. Results of the trials indicated hat the susceptibility of the weevils to Toxaphene as affected by depletion of food and by type of ood and that 4 or more times as much toxicant f the various preparations was required to obtain comparable kill in the field than in the laboratory. igh temperatures, sunshine, wide ranges in relave humidity, dew or a combination of these ctors reduced the toxicity of the insecticides sted. Toxaphene, TM-1, Dieldrin and EPN tained their toxicity for weevils under these nvironmental conditions better than the other aterials tested. Most of the insecticides tested roved toxic to the cotton leaf-worm at rather low osages. Dieldrin did not prove as toxic to the af-worm as TM-269, and TM-711 proved more oxic than Aldrin. The toxicity of all the insectides used at these low dosages was greatly reduced y high temperatures, sunshine, etc. Toxaphene nd TM-1 were equally effective against the boll eevil and leaf-worm. The residual toxicity of M-269 was better than that of Dieldrin in the sts using the leaf-worm. [See also *Fld Crop bstr.* 5 : 894 and 895.]—E.B.O.

78 BLACKMAN, G. E. **Studies in the principles of phytotoxicity. I. The assessment of relative toxicity.** *J. exp. Bot.* 1952, **3,** No. 7, 1-27, bibl. 34. [Dep. Agric., Univ. Oxford]

his introductory paper is concerned with some of e methods that are being employed for the easurement and interpretation of the effects roduced by different groups of phytotoxic subances. [From *Herb. Abstr.*]—Extract.

79 SAMPFORD, M. R. **Studies in the principles of phytotoxicity. 2. Experimental designs and techniques of statistical analysis for the assessment of toxicity.** *J. exp. Bot.* 1952, **3,** No. 7, 28-46, bibl. 18. [Dep. Agric., Univ. Oxford]

he second paper in this series considers the layout of the experiments recorded in the first paper, and the methods of analysis appropriate to various types of design. [See previous abstract.] [From *Herb. Abstr.*]—Extract.

380 SIMON, E. W. and others. **Studies in the principles of phytotoxicity. 3. The pH factor and the toxicity of 3 : 5-dinitro-o-cresol, a weak acid.** *J. exp. Bot.* 1952, **3,** No. 7, 99-109, bibl. 16. [Dep. Agric., Univ. Oxford]

On the basis of the experiments made with *Brassica alba* and *Lemna minor*, it is concluded that where weak acids are applied as herbicidal sprays, the effect of pH in the spray is small, but the pH factor may be of importance for the control of aquatic plants. There is no simple relationship between the resistance of plants to weak acids and the internal pH of the plants' tissues. [See two previous abstracts.] [From *Herb. Abstr.*]—M.H.

381 HOSKINS, W. M. **How pest control programs affect residues in foods.** *Agric. Chem.* 1949, **4,** 22-7, 77-8, bibl. 14. [Univ. Calif.]

Enormous losses of yield can occur in Californian crops if no chemical insecticidal treatments are given. Data are presented showing, in ppm, the insecticidal residues at harvest following the field treatment of beans, maize, peas and potatoes. It is considered that these residues do not exceed the limits of safety and that new insecticidal materials are used at smaller doses and less often, are less stable and intrinsically less toxic than the older ones which they are replacing. [This abstract should be substituted for Abs. No. 770 in Vol. 4.]—C.L.S.

382 BOWEN, H. D. and others. **Application of electrostatic charging to the deposition of insecticides and fungicides on plant surfaces.** *Agric. Engng, St. Joseph, Mich.* 1952, **33,** No. 6, 34-50, bibl. 4, illus. [Mich. State Coll., East Lansing]

The general theory of electrostatic charges on dust is reviewed and the results of field and laboratory trials are given. Results to date indicate that the amount of dust required for dusting plant surfaces can be halved by the use of electrostatic charging and that this method can be extended for use with aerosols, smokes and sprays. It is stressed that a considerable amount of further work on the problem will be necessary before electrostatic charging becomes of value to the farmer.—P.J.B.

383 ENGLAND AND WALES. Ministry of Agriculture and Fisheries. **Crop protection products approval scheme. Approved list 1952.** 1952, pp. 14.

This leaflet contains a list of proprietary brands of insecticides, fungicides and herbicides approved by the Ministry of Agriculture for marketing in 1952. The names and location of the manufacturers of each product are listed. [From *Herb. Abstr.*]—K.L.

384 BRIEN, R. M. and DINGLEY, Joan M. **A revised list of plant diseases recorded in New Zealand.** *N.Z. Dep. sci. industr. Res.* 1951, pp. 62, bibl. 172. [Plant Dis. Div., Dep. Sci. Industr. Res.]

The present work constitutes a revision of the 1939 " List of Plant Diseases Recorded in New Zealand," Department of Scientific and Industrial Research Bulletin No. 67. It includes also those diseases recorded in the " First Supplement " (Brien 1942), in the " Second Supplement " (Brien 1946), and those identified since 1946. In this publication are listed 533 diseases on 567 host plants, comprising diseases of fungous, bacterial, virus and physiological origin. The list is arranged alphabetically under botanical names of host plants. Virus diseases are listed under their common names as used in the " *Review of Applied Mycology*," Vol. 24, Part 13, 1946. [From *Herb. Abstr.*]—From introduction.

385 ANDERSON, H. W. and GOTTLIEB, D. **Plant disease control with antibiotics.** *Econ. Bot.* 1952, **6**, No. 3, 294-308, bibl. 110. [Plant Path. Div., Univ. Ill., Urbana]

A review is given of recent studies on the use of a number of antibiotics for controlling fungal and bacterial diseases of plants. None of the antibiotics studied appears to hold promise for general use, but most have value for the limited treatment of plants.—P.J.B.

386 BRENIÈRE, J. La lutte antiacridienne en 1949 et 1950 au moyen d'avions et d'hélicoptères dans le sud-ouest de Madagascar. [**Locust control in 1949 and 1950 by means of aeroplanes and helicopters in the south-west of Madagascar.**] *Agron. trop., Nogent* 1952, **7**, 164-9.

387 PHILLIPS, W. M. and others. **Observations on the rabbit in West Wales.** *Nature, Lond.* 1952, **169**, No. 4308, 869-70, bibl. 9. [Christie Hospital and Holt Radium Inst., Manchester]

Results are reported of a study, extending over 4 years, on the damage caused to pastures and field crops on rabbit-infested farms in West Wales, with special regard to control measures and to rabbit biology. On a heavily-infested farm of 293 acres, following an initial trapping over half the area, a persistent application of cyanide fumigation and ferreting was successful in controlling rabbits. Results of an experiment on the effect of rabbit grazing on a pasture reseeded direct with a mixture of *Lolium perenne, L. italicum, Trifolium pratense, T. repens* and rape, showed that herbage yield was reduced, weeds were increased, and growth rate of the herbage and its feeding value were adversely affected. [From *Herb. Abstr.*]—M.H.

388 HORBER, E. Die Bekämpfung der Schädlinge im Acker- und Futterbau. [**Control of pests in field crops and fodder production.**] *Schweiz. landw. Mh.* 1952, **30**, 48-74, bibl. 24.

An account is given of technical progress made in the control of the cockchafer (*Melolontha vulgaris*). In a general account of chemical insecticides reference is made to the danger of poisoning livestock and bees. Because of unforeseeable results which could follow the indiscriminate use of chemical insecticides, better cultivation methods and the breeding of resistant varieties of plants are preferred as measures for preventing mass increase of insect populations. [From *Herb. Abstr.*]—D.B.

389 ENGLAND AND WALES. Ministry of Agriculture and Fisheries. **Full-time agricultural education in England and Wales.** 1952, pp. 19.

This leaflet outlines the facilities available at, and the qualifications required for admission to, the various University Departments of Agriculture, Agricultural Colleges and County Agricultural Institutes in England and Wales.—K.L.

390 HOOPER, A. Dorothy. **Rural electrification and the farming community in Wales.** *Univ. Coll. Wales, Dep. Agric. Econ.* 1952, pp. 12, maps 13, 3s. 6d. [Agric. Res. Build., Penglais, Aberystwyth]

The report is a brief discussion on rural electrification in Wales and is an attempt to sketch in broad outline some aspects of the problems involved in the extension of electricity supplies to rural districts. —From foreword.

391 FAO. **The state of food and agriculture. Review and outlook 1951.** 1951, pp. 90. [Rome]

392 FAO. **Activities of FAO under the expanded technical assistance program 1950-52** 1952, pp. 76, illus.

393 UNESCO. Publ. No. 7. **List of scientific papers published in the Middle East received between 1.11.50 and 30.9.51.** [Title also given in French.] 1951, pp. 77, Cairo; Middle East Sci. Co-op. Office.

This publication includes lists of all scientific eriodicals and a list of scientific papers on agri-ultural subjects published in Afghanistan, Cyprus, gypt, Iran, Iraq, Israel, Lebanon, Pakistan udan, Syria and Turkey.—A.G.G.H.

94 UNESCO. **Scientific institutions and scientists in Latin America. Ecuador (1st Vol.).** 1952, pp. 74. [Montevideo]

95 NETHERLANDS. Government Committee for the Compilation of the List of Field Crop Varieties. 27e Beschrijvende rassenlijst voor landbouwgewassen 1952. [**27th descriptive list of field crop varieties, 1952.**] 1952, pp. 314, Wageningen, English commentary pp. 19.

96 PAREDES, A. Especies ecuatorianas de importancia industrial ordenadas segun el sistema de Wettstein. [**Ecuadorian plant species of industrial importance, arranged according to Wettstein's system.**] *Bol. Inst. Cienc. nat. Quito* 1952, **1,** No. 1, 80-99.

rees, shrubs and herbaceous plants (28) are escribed, with notes on their distribution and the roducts obtainable from them.—G.M.R.

97 ENGLAND and WALES. Ministry of Agriculture and Fisheries. Adv. Leafl. 401. **Windrow harvesting.** 1952, pp. 4, illus.

his method consists of cutting the crop with a vindrower and threshing it with a combine har-ester fitted with a pick-up attachment. The dvantages and disadvantages associated with he system are discussed. Windrowing is applic-ble to a wide range of crops, including wheat, ats, barley, mixed corn and cereal/legume mix-ures.—K.L.

98 HENDERSON, S. M. **A basic concept of equilibrium moisture.** *Agric. Engng, St. Joseph, Mich.* 1952, **33,** No. 1, 29-32, bibl. 26. [Agric. Engng Div., Calif. Univ., Davis]

he results are given of studies to determine the athematical characteristics of equilibrium mois-ure curves, with particular reference to the effect f temperature on the position of the curve.

99 HUNT, K. E. **Statistics for colonial agriculture. Report on the organisation of recording and estimating.** *Res. Publ. Colon. Office 11* 1952, pp. 84, append. 8. [Inst. Res. Agric. Econ., Univ. Oxford]

his report is intended for the 'handyman' in conomic statistics of agriculture, whether he is esponsible only for the field work in enquiries irected by expert statisticians or for the complete rganization of less ambitious studies. In addition o dealing with details of field recording, it aims to give a sufficient outline of the principles on which statistical enquiries are planned, to show the relation of the field work to the whole and to enable those without statistical training who undertake complete enquiries to produce workmanlike results. —From preface.

400 YATES, F. **Principles governing the amount of experimentation in developmental work.** *Nature, Lond.* 1952, **170,** No. 4317, 138-40, bibl. 5. [Rothamsted Exp. Sta., Harpenden, Herts.]

The author discusses the application of mathematical principles to schemes of development in which scientific discoveries are put into practice, and elaborates his thesis by describing its bearing on certain agricultural problems, such as the effect of fertilizers on field crop and grassland production. "If experimental work in agriculture is to be expanded to a more economic level it will, of course, require a complete reconstruction of the existing machinery for experiments. More work is required not only on fertilizers, but also on the many other aspects of crop and live-stock production that are capable of simple and exact investigation by empirical experiments." [From *Herb. Abstr.*]—M.H.

401 NISSEN, O. En plan for faktorielle forsøk med hovedvekten på bestemmelse av samspillene. [**Designs for factorial experiments when the interactions are of major interest.**] *Forskn. Fors. Landbr.* 1951, **2,** 203-14, English summary p. 214. [Norges Landbr-Høgsk., Vollebekk, Norway]

402 EDINBURGH and East of Scotland College of Agriculture. Bull. No. 32. **Notes on a short course in methods of sampling and the establishment of experiments.** 1952, pp. 55, illus.

The following papers were included in the course: the sampling of soils and agricultural crops, by A. M. Smith, F. E. Moon and K. Simpson; methods of sampling root crops, by V. M. M. Davey; silage sampling, by S. M. Wylie; the establishment of experiments, by J. C. Holmes; the principles and accuracy of sampling, by D. N. Lawley. [From *Herb. Abstr.*]—K.L.

403 CONAGIN, A. Disposição sistemática dos canteiros. Sua influência sôbre a estimativa do êrro experimental. [**Systematic plot arrangement. Its influence upon the estimate of experimental error.**] *Bragantia* 1950, **10,** No. 7, 203-7, bibl. 2, English summary p. 207. [Inst. Agron., Campinas, São Paulo, Brazil]

The results of superimposing certain types of 5 × 5 Latin squares on a wheat uniformity trial are described. The purpose was to investigate the bias in the estimate of error when certain systematic squares (knight's move and diagonal) are chosen and to compare the results under conditions in Brazil with those obtained by Tedin (*J. agric. Sci.* 1931, 21, 191-208). It is concluded that (a) when Latin squares are chosen by a random process, as recommended by Fisher, the observed distribution of the variance ratio of "treatments" compared with error is in agreement with that given by theory ; (b) the estimation of error variance is biased when systematic squares are employed. In agreement with Tedin, it is found that the knight's move square furnishes an overestimate, and the diagonal square an underestimate of error variance. Under the conditions of the Brazilian trial, the systematic squares are found to suffer under the same disadvantages as those noted elsewhere.—Author's summary.

404 Martin, W. P. and others. **Soil and crop responses from field applications of soil conditioners.** *Soil Sci.* 1952, **73,** No. 6, 455-71, bibl. 14, illus. [Ohio Agric. Exp. Sta.]

The effects of soil treatment with Krilium on the growth of many crops were tested in statistically laid out field experiments. Not all crops responded to treatment although in many instances yields increased appreciably. Maize, oats and carrots were most responsive to conditioner treatment. No toxicities were noted.—From authors' summary.

405 UNESCO. **Report on the activities and the meeting of the Co-ordinating Committee on Abstracting and Indexing in the Medical and Biological Sciences.** [n.d.], pp. 92, append. 3. [Received 1952] [Paris]

This first report gives an account of the origin of the Committee and of its proceedings and decisions from October, 1947, to the end of 1949. The report is concerned primarily with human medicine and with such parts of biology as have an immediate bearing on medical knowledge. Papers prepared for the Committee's meetings by members and by the Secretariat of UNESCO are reproduced in full, together with such parts of the discussions as help to explain attitudes of mind or to clarify issues. It was proposed at the UNESCO International Conference on Science Abstracting in June, 1949 (p. 87), that UNESCO should invite appropriate international bodies, including scientific unions and the Food and Agriculture Organization, to co-operate in setting up Subject Committees of users and publishers of abstracts of agriculture and applied biology, among others, to deal with abstracting problems at the international level, and that UNESCO should offer these new committees facilities similar to those already provided by the existing Committee for Medical and Biological Sciences.—K.L.

BOOKS AND REPORTS

BOOKS

406 Turrill, W. B. and Milne-Redhead, E. **Flora of tropical East Africa : Oleaceae.** 1952, pp. 31, illus., London ; Crown Agents for the Colonies, 25 × 16, [price not shown].

This is the second instalment of the above flora to be published, the first part, Ranunculaceae, having been published on 11.2.52 [*vide* review in *Fld Crop Abstr.* 5 : 1376]. [From *Herb. Abstr.*]—A. G. G. Hill.

407 Carrisso, L. W. and others. **Conspectus florae angolensis. Vol. I, Fasc. II.** 1951, pp. 177-422, bibl. in text, illus, map 1, Lisboa ; Minist. Ultramar, Junta Invest. Colon., 24 × 17.

This conspectus of the Angola flora, initiated by the late Prof. L. W. Carrisso, was compiled by the Instituto Botánico, Coimbra, Portugal, in collaboration with the British Museum. The first fascicle, containing pp. 1-176, was published in 1937, but the outbreak of the world war prevented the appearance of the second fascicle until 1951. In arranging the material, the system of Bentham and Hooker is followed (*Genera Plantarum*, 1862-76). The second fascicle comprises : the Malvaceae to the Aquifoliaceae, by Exell and Mendonça, pp. 177-348 ; addenda and corrigenda, pp. 349-76 (English summary pp. 351-2) ; synopsis of the families treated, pp. 377-400 ; and index of botanical names, pp. 401-22. For each plant identified, notes are presented on taxonomy, habit and ecology, and geographical distribution. Attention may be drawn to *Gossypium*, 6 spp. and 1 var. listed, pp. 181-4 and *Linum*, 2 spp., pp. 242-3.—G. M. Roseveare.

408 Duckham, A. N. **American agriculture. Its background and its lessons.** 1952, pp. 78, illus., London ; H.M.S.O., 15 × 24, 2s. 6d.

The author was Agricultural Attaché in Washington from 1945 to 1950, during which time he travelled through all the 48 States of the USA. From his observations he has produced a highly readable, factual account of the American agricultural scene. He has had two main objects in view when preparing this report, firstly, to give an account of the physical, social, technical and commercial background of agriculture as practised the different regions of the USA and secondly, suggest those aspects of American agriculture hich can provide lessons of potential value to griculturalists in the United Kingdom. The eport is divided into five sections and covers a ery wide range of topics which are summarized nder the following heads : (a) the geographical nd social background, (b) the framework of rural rganization and the agricultural services, (c) production techniques for crops, grass and livestock, e use of soils and fertilizers, farm buildings and achinery, (d) farm organization and labour conomy, and (e) a section containing the summary nd conclusions, statistical data and a map of the eneralized types of farming in the USA. The eneral conclusion reached is that in no part of the SA do the ecological conditions and farming ystems have an exact counterpart in Britain, thus, ost of the lessons of value to conditions in Britain re those least subject to ecological and social actors, such as advances in pure and applied cience, live-stock production and in farm machinery tc. Those parts of the USA of most value to us rom this point of view would appear to be the ore progressive northern States, here, the field of arm organization and labour economy hold useful essons for Britain. The American emphasis on arming as a way of making money and such factors as the tendency towards specialization in one r two crops, and the reliance on the plant breeder he chemist and the machinery salesman to solve ultivation problems, means that a good deal could e learnt from Britain about good husbandry. erhaps the most important differences between he farming of Britain and the USA are bound up n the question of attitude of mind. In some espects, Britain is ahead of the USA, in others, it is ehind. Not the least valuable function of this eport may be that it stimulates re-examination of any aspects of British agriculture that are taken or granted. It will also be of considerable interest o those in the USA who consider an outsider's iews of value to the understanding of themselves. From *Herb. Abstr.*]—P. J. Boyle.

409 NUTTONSON, M. Y. **Ecological crop geography and field practices of Japan. Japan's natural vegetation, and agro-climatic analogues in North America.** 1951, pp. 213, bibl. 62, illus., Washington, D.C. ; Amer. Inst. Crop Ecol.

‘ The objective of this study is to organize, define nd analyze the various distinct agro-climatic conitions prevailing in the different parts of Japan nd to compare them with various agro-climatic egions of North America in order to ascertain the limatic or thermal analogues.” An account is iven of the geography, climate, soils and natural egetation of Japan, her farm crops and practices nd the control of diseases and insect pests of farm crops. Finally, there is a chapter on the genetico-ecological classification of crop varieties and a description of agro-ecological regions of Japan. The work is richly illustrated with maps, graphs, diagrams and tables. Some of these show the several agro-climatic regions, the crops and the diseases and pests of these regions ; others illustrate dates of planting, transplanting and harvesting of the staple crops in the various regions. Acreages and yields of crops are classified by prefectures. The material presented should help forward the work of plant introduction and the exchange of varieties among the various agricultural areas of the world.—D. Brown.

410 JONARD, P. Les blés tendres (*Triticum vulgare* Vill.) cultivés en France. Détermination et caractéristiques culturales. [**The soft wheats grown in France. Identification and cultural characteristics.**] 1951, pp. 491, bibl. 167, illus., pl. 10, Paris ; Inst. Nat. Rech. Agron., 25 × 17, 1600 fr.

M. Jonard's book contains on the one hand a valuable botanical study of the wheat plant and on the other a very large amount of classified information on 137 varieties of soft wheat grown in France, information which enables them to be identified and provides an indication of their degree of suitability and productivity under different environmental conditions.

Having examined the numerous classifications of wheat which have been made to date, whether botanical (from Linnaeus, 1753, onwards), cytological (from Sakamura, 1918, onwards), or agronomic (from Jordan, 1870, onwards), the author notes that his own description of the French varieties is based upon two groups of characters, the morphological, of especial taxonomic value, and the physiological, of little use for identification but of great interest as regards utilization. The first impression given by the French wheats is that of similarity, both in aspect and cultural characters : varietal differences are seen principally in small morphological characters such as the tip of the glume, pilosity of the inner side of the glume, etc. Some explanation of this similarity is furnished in a short genetical study of popular varieties. Of the morphological characters described and illustrated by excellent drawings, eleven are concerned with the ear and notably with the glumes and pales. These characters are described as static and of no use until the life cycle of the plant has been terminated, but characters are also used which are of value at 4 different stages of development, such as spreading or erect habit, pilosity of the ligules, and colour of the leaves during the tillering stage ; and other characters during the stages of haulm formation to earing, earing to fertilization, and fertilization to maturity (pigmentation of the anthers, etc.). Chapter 3 deals with physiological characters such as resistance to cold; tendency to lodge or to shrivelling of grain or to sprouting in the ear; resistance to rust, smut, and other diseases; tillering capacity, earliness; capacity for alternation (i.e. for sowing either in autumn or early in spring); productivity; and baking quality. In addition, an account is given of legislation on the wheat seed trade in France and on the control and official cataloguing of recognized varieties. From 1943 onwards regional trials have furnished much information on the yields which may be expected from the most widely grown varieties as well as on the regions and types of soil for which they are best suited. Future breeding should aim at increased resistance to certain climatic adversities and to disease; under favourable conditions productivity is good.

Two Tables of Identification are given for the 126 varieties registered in the official Catalogue up to 1946; they are based respectively on the characters of the ear (the " static " characters) and on the vegetative characters of those distinguishable during the course of development. Finally, for each of these 126 varieties and for 11 subsequently registered, clearly classified information is presented on all the above-mentioned characters and on the genetic history, the breeder, and the date of breeding.

Points which impress the reader are the admirable lucidity of the writing and the pleasing printing and construction of the book.—G. M. Roseveare.

411 Hunter, H. **The barley crop.** 1952, pp. ix + 187, illus., London; Crosby Lockwood and Son, Ltd., 23 × 14, 21s.

Since 1926, when Dr. Hunter, who is recognized as one of our foremost authorities on the cereal crops, published his first book on barley, a large amount of new knowledge has accrued and a whole range of new varieties has been introduced to British Agriculture. In this, his latest book, an up-to-date and comprehensive account of all aspects of barley production is presented, ranging from theoretical considerations concerning the origin of the cultivated forms of barley to some of the more practical applications.

The first two chapters which follow the short introductory chapter are devoted to the botanical aspects of the crop. In Chapter II the various systems of classification adopted by different authorities are discussed. One of these, namely Atterberg's classification, which is described in detail, is considered by the author to be the most complete since it furnishes a definite and constant means of identifying varieties.

Some interesting statistics of acreages, yields and distribution are given in Chapter IV. The acreage figures presented for 1944 emphasize a significant increase in barley growing in this country amounting to 95 per cent on 1939 returns, an increase which is even greater than that for wheat in the same period. The interpretation put forward by the author to account for this is that: " . . . . . the greater increase of barley can hardly be regarded as a fortuitous feature and may be interpreted, in part, as the expression of strictly economic influences, but with equal likelihood as the result of the greater reliability of barley in point of yield on the generality of all but really heavy soils". With the barley acreage for 1952 standing at just over two million acres for England and Wales, being slightly more even than that for wheat, it is evident that the crop fills a position of ever increasing importance in the economy of those areas predominantly suited to its production.

Quality is at all times an important factor in determining the value of the barley crop and it is consequently evident that, in any publication of this kind, reference must be made to this aspect. Indeed, it is not surprising to find that Dr. Hunter has approached his whole subject from the malting angle since he himself has made a life's study of this problem and has made very substantial contributions to the industry through his researches and by the production of Spratt-Archer. This variety, specifically bred to meet the needs of both farmer and maltster, with Dr. Beaven's Plumage-Archer, still hold a predominant position amongst varieties of malting barleys in this country. The whole question of quality is critically examined by the author and the qualitative and quantitative assessment of the recently introduced Kenia series of varieties, important to both farmer and maltster, is discussed.

Dr. Hunter states that the enhancement in yield of grain brought about since the opening of the century by the introduction of improved varieties is approximately 20 per cent and that any further improvements appear to rest with new varieties which are being developed from crosses between Kenia and native malting varieties to secure the high grain-yielding capacity, 'lodging' resistance and earliness of Kenia barleys, combined with the good malting qualities of Plumage-Archer and Spratt-Archer.

Much valuable information and general advice on manuring and growing the crop is also included in this book. Since, however, the maltsters require the produce of rather less than half the total acreage of barley grown at the present time, one would have liked to see this otherwise excellent book extended to include more information about feeding barley.

The book is well written and attractively produced. It will undoubtedly become a standard work of reference and is recommended to all those engaged in the production, processing or study of the barley crop.—D. J. Griffiths.

2 Haarer, A. E. **Jute substitute fibres.** 1952, pp. xxi + 185, illus., bibl. 156, London ; Wheatland Journals, Ltd., 22 × 14, 30s.

t a time when so many countries, nervous of their ependence for jute supplies on Pakistan or India, e conducting large-scale experiments on jute subitutes, a book on the subject is most timely. r. Haarer has performed his task well, but readers ould be warned that the book deals only with the ree most important jute substitutes : *Hibiscus nnabinus* (Bimlipatam jute or kenaf), *H. sabriffa* var. *altissima* (roselle), and *Urena lobata* ramina fibre). Some may be disappointed to d hardly more than a mention of *Cephalonema lyandrum* and *Abroma augusta*, the first of which in substantial production and the second still der serious consideration in the Belgian Congo, d no mention of *Clappertonia*, which has been der active trial in Nigeria for some time. But ere is little doubt that on present evidence the thor's estimate of relative importance is right, is also the perspective which causes him to allot ore space to *Hibiscus cannabinus* than to the her two crops put together.

Each of these three crops is fully dealt with : its tany, genetics, climatic and cultural requireents, diseases and pests, harvesting, and finally at bugbear of the fibre industry, methods of cortication, retting, and scutching. Here again . Haarer selects the right points to emphasize. e exhaustive nature of all these crops, with the avy tonnages which are taken off the land, is essed. Photoperiodicity in *H. cannabinus*, escially as far as present knowledge goes, is important in determining sowing dates and perhaps choice seed. The unselected seed from which crops for e submission of early samples of fibre were grown, well as poor preparation in many cases, make rrent estimates of yield and quality tentative at st. The author considers that for peasant oduction of these crops, group facilities for ting and handling of the fibre will probably be a ical development. Mechanization of fibre exction is being urgently explored and machines being constantly improved.

The style of the book is non-technical, in places nost popular, but the technical information availle is presented in detail, and there are excellent istrations and a full bibliography. The very stence of sufficient material for a book of this t to be written indicates that these crops have me to stay. Experiments and commercial proction are likely to proceed at an increasing pace, l those engaged in the work will do well to have s book beside them so that they may build on foundations already laid.—G. B. Masefield.

3 van Soest, J. L. and others. Grassen en granen. [**Grasses and cereals.**] 1951, pp. 651, illus., Zwolle ; W. E. J. Tjeenk Willink 16 × 23, 16 guilders.

This book has been produced by a number of specialists in the Netherlands, and compiled by an editorial committee headed by Professor van Soest. It treats the grasses and cereals together in two main sections, one general and the other systematic. The first section of 396 pages is divided up under a number of subheads, dealing with the botany, genetics, systematics, geography, ecology and sociology, cultivation, pests and diseases, conservation and processing. The large number of articles contributed to this section are of somewhat uneven merit, those dealing more particularly with the agronomy of the grasses and cereals being rather sketchy. The book as a whole suffers from a tendency to cram a quart into a pint pot and the lack of space has, no doubt, limited the treatment of the more purely agronomic aspects of the subject ; on the other hand, the more academic aspects are treated much better and include a number of admirable contributions, particularly those dealing with genetics, anatomy and pests and diseases. The systematic section of the book comprises 229 pages of genera arranged in alphabetical order and with the nomenclature in conformity with the *Flora Neerlandica*. Notes are given on the botanical characters of each genus and on the most important species within each genus, including their common names in Dutch, German, English and French, their ecology, agricultural value and main pests and diseases. There is a subject index and a list of the institutes and organizations working on different aspects of the grasses and cereals in the Netherlands. The book, as a whole, constitutes a valuable and many-sided summary of information on the grasses and cereals. The introduction makes mention of the " average Dutchman," for whom it appears to be primarily intended as a means of widening his appreciation of a subject that he tends to take for granted. However, the student and the professional agriculturalist, both in the Netherlands and, if he is a reader of Dutch, in other temperate regions also, will find this book of considerable value. [From *Herb. Abstr.*]—P. J. Boyle.

414 Harvey, P. N. **The practice of arable crop experimentation.** 1952, pp. 79, bibl. 10, illus., Norwich ; Norfolk Agric. Sta., 22 × 14, 6s.

Although there are quite a number of books on the design of field experiments and the statistical interpretation of the data, the literature on the practical steps which should be taken when carrying out trials in the field is limited ; clearly, these steps will differ according to the degree of farm mechanization employed and the farming practices which are being enquired into. This handbook sets out the methods which are being used in conducting arable, field-crop trials at the Norfolk Agricultural Station, Sprowston, and are based on twenty-five years cumulative experience there.

After a brief review of the principles of field experimentation and their translation into standard-trial designs, there is a short chapter on the general precautions to be taken for reducing experimental error, followed by advice on setting out and demarcating the trial on the ground. The procedure with cereal row-crops is then dealt with in detail and covers : size and shape of plot, choice of corn-drill, the advocated procedure for drilling (according to whether plot treatments have been applied prior to sowing or not) and methods of harvesting.

The chapter on experiments with root crops is almost entirely confined to sugar-beet and potatoes, the emphasis being on the former where the particular problems associated with row-spacing, initial seedling-stand-uniformity, plant-stand after thinning, and singling have to be carefully considered.

The final short chapters deal with sampling methods, the application of fertilizers and farmyard manure, drill testing and calibrating, record keeping and the labelling of blocks and plots.

This very practical, pocket-sized, low-priced book, with its clear style and explanatory text-figures can be strongly recommended to those whose work is connected with the planning or carrying out of precise field experiments with annual crops involving the use of farm machinery. —C. L. Skidmore.

415 PADWICK, G. W. **Manual of rice diseases.** 1950, pp. 198, illus., Kew, Surrey ; Commonw. Mycol. Inst., 25 × 16, 30s.

Extensive bibliographical research backed by personal study of most of the important diseases of rice have enabled the author to present a comprehensive review of the literature on the subject. Parts I and II of the book deal with parasitic and non-parasitic diseases, respectively, whilst Part III is an annotated check-list of fungi recorded from rice.—C. L. Skidmore.

416 TARR, S. A. J. **Leaf curl disease of cotton.** 1951, pp. 55, bibl. 113, illus, Kew, Surrey ; Commonw. Mycol. Inst., 25 × 16.

This monograph gives a comprehensive account of leaf curl disease of cotton in the Anglo-Egyptian Sudan.—C. L. Skidmore.

417 WALKER, J. C. **Diseases of vegetable crops.** 1952, pp. 529, illus., London (New York, Toronto) ; McGraw Hill Book Co., Inc., 22 × 14, $7.50.

Diseases of thirty kinds of vegetables are here described by the Professor of Plant Pathology at the University of Wisconsin. They are discussed with reference to symptoms, causal agents, cycles of development and methods of control. Relevant references are given at the end of the description of each disease. After a short preface, the author takes the host plants in alphabetical order. Vegetables grown as field crops include potato and sweet potato (*Ipomoea batatas*). The former, because of its importance, is dealt with at some length (chapter 12, pp. 314-93, or rather more than one-seventh of the whole book), while the latter occupies chapter 15, pp. 407-30. The diseases are described under their common names, though the scientific names of fungal and bacterial pathogens appear in the text.

Some diseases are only briefly mentioned under a particular host, but receive detailed treatment under other hosts. Thus Verticillium wilt of potato, a serious disease in Britain and in North America, occupies only half a page under potato, but, under tomato the wilt receives two pages. Again, Texas root rot is given only eleven lines under sweet potato, but is described, and the fungus illustrated, on an earlier page under bean. In such cases it would be helpful if the pages were quoted so that the more complete descriptions could be readily found.

Potato diseases are discussed under non-parasitic disorders (including those which are due to deficiencies of nitrogen, phosphorus, potassium and magnesium, and excess of manganese), fungal, bacterial, and nematode diseases, two diseases incited by insects (hopperburn and psyllid yellows), and virus diseases, with descriptions of mosaic, leaf roll, spindle tuber and unmottled curly dwarf, yellow dwarf, purple top, calico, witches'-broom, spotted wilt, and tobacco ring spot. Particular attention is given to common scab (pp. 329-34) and late blight (pp. 343-52), which occur wherever potatoes are grown. The complex nature of some of these diseases and the attendant control difficulties are well exemplified by ring rot (pp. 325-9).

As with potato, some diseases of the sweet potato described affect the tubers (e.g. low-temperature injury, internal breakdown, and particularly Rhizopus soft rot), while others affect the growing plant, such as boron deficiency, soil rot, Pythium diseases, Fusarium wilt and black rot (*Ceratostomella fimbriata*). The virus diseases of sweet potato are less important than those of potato, but mention is made of a mosaic disease in Arkansas, a feathery yellowing of the foliage, and internal cork.

The book is illustrated by clear drawings and many well-reproduced photographs and, since vegetable crops are grown in every country, the information set out will assuredly be appreciated by practical growers and horticultural students, while research workers will find the numerous references helpful.—H. Wormald.

8 Ordish, G. **Untaken harvest. Man's loss of crops from pest, weed and disease.** 1952, pp. xii + 171, bibl. 118, London ; Constable and Co., 22 × 14, 15s.

is stimulating book presents an introductory
idy of the economics of crop protection, exposes
e relative neglect of the economic aspect up to the
esent and urges the importance of its inclusion in
future research. " We still do not give enough
onomic thought to our pest problems. We need
ore detailed surveys of the amount of damage
ne each year by pests, so that our very limited
ientific resources can be directed to conquering
e worst problems." While within the last 90
ars, and especially during the last 20 years,
ormous strides have been made in the prevention
d control of pests, diseases and weeds, there is an
tonishing lack of knowledge on the extent of the
mage done and the cost of control.

The author's study of the volume, value, and
cial consequences of the losses to food supply
ves an alarming picture. The real loss is not so
uch monetary as that of land, labour and re-
urces used to grow ungathered crops ; but in
mmarizing the position, it is best to consider both
nd and money, because only in monetary terms
n loss of quality and difference in value per acre
a crop be expressed. Losses due to pests (the
ord denotes here animal pests, diseases and weeds)
all parts of the world are considered. Figures
e available in more abundance from the U.S.A.
an from elsewhere ; those for Britain are scanty
d not such as to impress the grower. " It is
th doubtful whether the amount of damage done
pests is realised, and whether such figures as we
n put forward will be believed." For this
ason the author's tabulated assessment of pest-
used damage to the main crops in Britain (pp.
-5) will be of much interest. The estimates of
mage, based on 1947 averages, are conservative,
t there is a total loss of 1.9 million acres which
tually produce no crop and losses equivalent to
8 million even after nearly £10 million have been
ent on control. In other words, " in effect over
,000 farms produce no crop in the United King-
m, and . . . the labour of more than 51,000
illed farm workers is wasted on account of the
vages of pests". Technical advances in control
ght well have reduced these figures by 1951, but
e position is still serious. Total world losses are
nsidered as at least equal to the annual loss of all
e crops of the United States. These losses,
ites Lord Bledisloe in the foreword, should be
set against the grim background of two facts,
st, that mankind has never in its long history
d sufficient to eat, and secondly, that at present
es of increase the population of the world will in
years exceed its present figure by 500 million".

Against this background the chapters on econ-
nic effects, methods of combating loss, social effects, and present and future crop protection are illuminating and not without hopefulness. Throughout, the need for better co-operation, for an ecological outlook, and for economic information is stressed. In the last chapter, a brief history of the trade in pesticides and related products is given and its inter-relations with scientific research noted, and the author concludes by saying : " In the future, when we must produce more and more food, let us not neglect the fullest possible economic study of the unproductive acres. To-morrow even less than to-day can the world support the loss of its Untaken Harvest."—G. M. Roseveare.

419 Hewitt, E. J. **Sand and water culture methods used in the study of plant nutrition.** *Tech. Commun. East Malling, Commonw. Bur. Hort. Plant. Crops* 22 1952, pp. x + 241, bibl. pp. 202-32, illus., Farnham Royal, Bucks ; Commonw. Agric. Bur., 25 × 18, 42s. or $6.25.

This book describes the methods devised to study the growth and mineral nutrition of plants in controlled cultures. Special attention is given to the problems of trace contamination and methods for the efficient study of the plant micro-nutrients. Containers, sand, water, nutrient composition and supply, aeration, biological factors and related matters are also considered in detail. The information compiled and the standard techniques described should serve as a guide and reference work for all who study plant nutrition in sand or water culture.

420 Chouard, P. Cultures sans sol. [**Soil-less cultivation.**] 1952, pp. 200, bibl. 46, illus., Paris ; Maison Rustique, 19 × 14.

The aim of this book is to supply reliable information on that much abused technique, soil-less culture, and the reader will certainly find in it an unbiased, scientific account of the principles involved and a critical estimate of its value. Like the recent manual by Ticquet it deals with the preparation and control of nutrient solutions, the various types of soil-less culture, and cultural techniques, but, unlike Ticquet's book, the emphasis is on theory rather than practice. For instance, a long chapter is devoted to the physiology of growth and nutrition, and the chemistry of the solutions is dealt with in some detail, while rather less attention is paid to the specific problems with which the grower is likely to be faced. An exception to this slightly theoretical approach is the chapter on pre-germinating seeds for use as cattle fodder, a water culture technique which the author considers to be of great practical value and which is described very fully. This survey will give the student a comprehensive picture of the situation, and the grower a useful groundwork of information from which to tackle his own particular problems. [From *Herb. Abstr.*]—From *Hort. Abstr.*

421 ANNUAL REVIEW OF PLANT PHYSIOLOGY. 1952, **3**, pp. 369.

This issue contains reviews of the following subjects: metabolism of phosphorylated compounds in plants, by H. Albaum; agricultural application of growth regulators and their physiological basis, by J. van Overbeek; leaf proteins, by S. Wildman and A. Jagendorf; physiological aspects of low temperature preservation of plant products, by M. A. Joslyn and H. C. Diehl; mechanisms of ion absorption by roots, by R. Overstreet and L. Jacobson; physiological bases for assessing the nutritional requirements of plants, by A. Ulrich; photosynthesis, by E. Rabinowitch; and physiology of flowering, by A. Lang.—M. Hall.

422 THOMAS, Mary. **Back crossing. The theory and practice of the backcross method in the breeding of some non-cereal crops.** 1952, pp. vi + 136, bibl. 436, Farnham Royal; Commonw. Agric. Bur., 22 × 14, 15s.

The method of repeatedly backcrossing a new hybrid to one of its parents as a means of transferring a single gene from the other parent may seem dangerously straightforward in the example chosen for the textbook or lecture. Mrs. Thomas has prefaced her work with a short account of the theory of the method, in which some of the difficulties that may arise are mentioned; however, the seriousness of some of these complications is made quite clear in later chapters when she describes some projects that have had to be abandoned after several generations of breeding and selection. The longest section of the book deals with the application of the backcross method to cotton breeding. It is based on 177 references, many of which are to annual or progress reports rather than to genetical papers; the history of a particular breeding programme is built up from successive reports, and the author sometimes points out apparent discrepancies and suggests possible explanations for them. The projects discussed include the transfer of marker genes of no immediate commercial value, breeding for commercially desirable plant and fibre characters, and breeding—usually with success—for resistance to pests and diseases. The shorter section on tobacco (74 references) covers work on a wider range of characters, including resistance to diseases, earliness, quality and nicotine content. The account of tomato breeding (117 references) deals chiefly with the use of the backcross technique in the transfer of genes for disease resistance from wild species of *Lycopersicon* to the cultivated tomato; in most cases repeated backcrossing is essential to regain commercially acceptable fruit size. Turning from crops propagated by seed, in which some degree of homozygosity is needed, the last chapter covers work on the transfer of hardiness and resistance to disease and Colorado beetle from various *Solanum* species to the cultivated potato. Here the story is often complicated by the different levels of polyploidy encountered, with consequent hybrid sterility, and to some extent simplified by clonal propagation of the desirable seedlings. Considering the mixed raw material on which it is based, this book is remarkably easy to read. One curious slip is the inclusion in the chapter on tomato breeding of material already discussed under tobacco breeding; at first sight this appears to imply intergeneric crossing! However, the references are to the same paper, in which the tomato is not mentioned.—G. K. C. Campbell.

423 MOORE, H. I. **Science and practice in cropping for meat and milk.** 1952, pp. 127, bibl. 24, illus., London; George Allen and Unwin, Ltd., 23 × 15, 14s.

It is not usually a difficult matter to note the omissions in the contents of a book in the light of its title and preface. The title may lead one to expect both circumspection and detail, whilst the preface may provide an indication of the style and scope of the volume. The author's name may be an added assurance that the material evidence is sound and authoritative. In his new book, Professor Moore fulfils most, but not all, of our expectations. His remarks in the preface that " the suggestion to discuss in detail the results of research and experiences of the farmer. . . ." imply that if not the whole field, then a considerable portion of the field of agricultural research relating to the subject matter would be adequately reviewed in the light of farming experience. It is true that scientific evidence is abstracted from a variety of sources and the author is perfectly at liberty to select his evidence. It is, however, surprising to find that in the chapters dealing more specifically with grassland, no reference is made to the researches of the Grassland Research Station, Stratford-on-Avon, nor to those of the Welsh Plant Breeding Station (apart from the mention of the S varieties of oats and the S strains of grasses and clovers). These are serious omissions, and they are the more surprising, since some of the experiments quoted by the author were initiated at these Stations and continue to be pursued by them.

In the first chapter, the problem which Dr. Moore has set himself to discuss is presumably the production of the maximum amount of cheap protein from intensively managed grass and forage crops. This problem is answered by the calculations in the last chapter on " Self Sufficiency in Action " by the carrying of 138 head of cattle (46 cows) and 140 sheep on almost 300 acres of farm land in Devon.

The six intervening chapters describe lucidly (apart from a few involved 70-word sentences) and convincingly, cultivation and manuring, the control of weeds and pests, the choice of varieties or seeds mixtures and the time of sowing, as well as the tilization of grass and a number of forage crops. These are valuable chapters to the student and the ducated farmer.

The main thesis of the book, however, is conerned with grass—" The Master Crop "—in its nany and varied aspects. Dr. Moore supports the iew that the best swards can be obtained only fter the land has gone through a complete arable otation, although admittedly there are advanages to be derived from direct reseeding and enovation. The seasonal growth curve of grass nd the changes in composition with age are reterated, whilst the means to extend the duration f the grazing season are forcibly described. In ddition, the behaviour of cattle and other types of ivestock are discussed and reference is made to the nanagement of grassland and to the many new roblems that continue to arise. The author draws ttention to bloat and to other pasture-grazing lisorders and the means by which they can be orrected. Unfortunately, too brief reference is nade to the limitations which the climate sets to rass production, to the extension of the grazing eason and to the nutritive values.

The author has drawn widely from his extensive xperiences, from his observations overseas as well s from those of practical farmers. The book is llustrated by a number of interesting photographs nd graphs and is amply provided with useful ables. Dr. Moore has mingled in a most interestng manner his reminiscences and scientific knowedge. Consequently the book contains not only mass of technical information, but also many aluable suggestions and ideas.—R. Phillips.

24 WHYTE, R. O. and YEO, Margarite L. **Green crop drying.** 1952, pp. 328, bibl. in text, illus., London ; Faber and Faber, Ltd., 23 × 14, 42s.

he authors have made a very comprehensive eview of the available literature and are to be ommended in their attempt to bring together n one book the vast quantity of information on opics allied to the drying of green crops. In the ast, too much emphasis has been placed on the erformance of the drier and insufficient on the ncillary equipment, particularly that for delivery f an adequate supply of good quality green materl to the drier. This book will do much to bring e various aspects of green crop drying into persective, although the inter-relationship of the arious aspects of drying unfortunately does not lways appear to be fully appreciated by the thors themselves.

While much is made of the need for growing good uality green material, there is frequent comparison f the quality of the finished product and that of ay. A green crop drier will, of course, dry hay, ut, as is admitted by the authors, the quality of e finished product will be no better than the material with which the drier was supplied. Hay, on the one hand, is a compromise between bulk and a reasonable feeding quality while, on the other hand, the aim in drying should be a high protein product from material cut at an earlier stage than would give sufficient bulk for hay. In this way hay and the products of drying should in no way be compared.

In the chapters dealing with crops the reader is led gently but firmly through the various stages from the principles involved in growing the crop to the feeding of the dried product. Having read this, he is left with a very clear picture of what is required, and of how he could set about attaining the necessary high standard. Unfortunately the same clear picture cannot be obtained of the problems associated with the collection and drying of the green material. Details are given of the equipment for collection and references are made to the performances of individual types, but that part of the chapter on harvesting dealing with forage-harvesters refers to the work carried out by Kalbfleisch in his investigation into the suitability of forage-harvesters for use in harvesting hay and crops for silage. The opinions of the Canadian farmers as to the advantages and disadvantages of the forage-harvester refer more to the unsuitability or condition of the chopped crop than to the harvester itself. No mention is made of the suitability or otherwise of a forage-harvester as a means of providing chopped material to the high-temperature type of drier. Similarly with regard to the driers themselves, the principles of drying are dealt with at some length and the construction of a wide range of makes and types is given in detail, even of driers which are still in the prototype stage. It is understandable that in dealing with the literature on green-crop drying emphasis should have been placed on the value of large-scale plant, and in particular, on the questionable labour- and fuel-saving capabilities of the high-temperature type of drier. Much more, however, has probably been written on this aspect of the subject than on the value of the smaller low-temperature type of drier in the hands of farmers. But although both types of driers are dealt with in detail, no genuine attempt is made to define the contribution which each type can make, in its own sphere, towards the supply of high-quality feeding material in Britain. Thermal efficiency is regarded as the standard for comparison, and no attempt is made to compare the various types in regard to labour requirement, suitability for specific conditions or crops. In quoting the thermal efficiency of some makes of driers the authors have been unduly optimistic when considering continuous operation.

The authors refer in their Foreword to the difficulty in keeping up to date with recent developments, but in this respect the reviewer considers that in a few of their recommendations they have been somewhat ambitious. In recommending the use of a stem-crusher, results are quoted in one instance from a series of experiments carried out in 1949, a year in which the weather was particularly favourable for curing hay. It is unlikely that in Britain there will be many days with a relative humidity of 43% and a ground temperature of 85.2°F. when the grass is at its maximum rate of growth. Again the reference is to hay, and to the fact that the use of a stem-crusher will bring the moisture content down to 26% at a rapid rate of natural drying. Elsewhere in the book it is stated that grass for drying should not be wilted below 60% moisture content. To date there has been no evidence produced to show similar rapid rates of drying, even with hay, or that the use of a stem-crusher gives any increase in the rate of wilting to 60% moisture content over more orthodox treatment. It is perhaps unfortunate that, in the chapter on lucerne and other leys, the authors have included in a book of this nature the results of a single year's pilot experiment. It might well be that in a year less favourable to the growth of lucerne, entirely different results would be obtained.

The value of the book lies in the composite references to all aspects of green crop drying, but would have been enhanced by the inclusion of a list of these references in the index and by a more critical review of the literature.—F. S. Mitchell.

REPORTS

The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated by giving a reference to the abstract.

425 **England and Wales.** Ministry of Agriculture and Fisheries. Report of the Committee appointed to review the Organization. London, 1951, pp. 57, 1s. 9d.

This is the so-called Ryan report. Some of its main conclusions are: that the County Agricultural Executive Committees (C.A.E.C.s) and the National Agricultural Advisory Service (N.A.A.S.) must continue to work very closely together, but it is not necessary for advisory officers to act as officers of the Committees or to work immediately under their direction; that the N.A.A.S. should function as a separate unit in the county in order to remove any possible impediment to their advisory work among farmers and to free them from non-technical duties; that County Offices should be established which will absorb from the C.A.E.C.s the trading services and routine departmental functions and the staffs engaged on them.—A.G.G.H.

426 HAYWARD, P. R. Third Annual Report on trial and experimental work carried out at Throws, Little Dunmow, 1950/51. Hasler and Co., Ltd. [n.d.], pp. 47. [Received 1952]

INVESTIGATIONS REPORTED:

1. Trials with old and new varieties of winter wheat, pp. 4-7.
2. Yield comparison trials of the popular French types of wheat and the English type Holdfast, pp. 7-8. The varieties Petit Quin Quin, Nord Desprez, Hybrid 46 and Jubilegem gave significantly higher yields than Holdfast.
3. Oat varietal trials, pp. 12-13. The general growth characteristics and yield figures indicated that Sun II is a heavy yielding type.
4. Dates of sowing cereals, pp. 13-14. Observations showed that the majority of spring varieties of oats and wheat produce a crop even when sown as late as May. The true winter varieties and Pioneer winter barley gave poor results when sown so late.
5. Linseed varietal trials, p. 14. Of the two new varieties Dakota and Valuta, Dakota compared favourably with the established variety Redwing in growth, flower production and ripening. Valuta was later in emerging and did not produce an even stand.
6. Breeding an improved strain of winter bean, pp. 15-20. A review is given of breeding work carried out since 1947.
7. Winter bean seed rate, spacing and manuring trial, pp. 21-4. Although plant tillering was increased by reduced plant populations (fewer rows and plants per ac.) this did not make up for the loss in numbers of actual plants in the final yields. From the results, it was considered advisable to grow winter beans in narrower rows than the standard 4-row procedure. In the manurial trial 3 cwt. per ac. of superphosphate plus 1 cwt. sulphate of potash as a top dressing gave increased yields in comparison with 2 cwt. compound manure (12-15-15) alone and compound manure plus a top dressing of 1 cwt. nitrogen per acre.—K.L.

427 **Northern Ireland.** Ministry of Agriculture. The research and experimental record, 1951. Belfast, 1952, pp. 136, bibl. in text.

Spring-oat variety trial, 1950. By E. V. B. Wilson and D. J. Hodges, pp. 75-9. Six varieties of spring oats were compared in County Antrim using a Latin square layout with the variety Stormont Iris as the control. S225 showed the greatest resistance to lodging, but was inferior in yield and quality. Sun II and Abed produced the highest grain yields with 34.6 and 32.3 cwt. per acre, and the best quality grain. S.84 was placed third with 31.3 cwt. grain per acre.

Flax varietal trial, 1950. By E. V. B. Wilson, pp. 80-6, bibl. 7. Stormont Gossamer L26, Liral Prince nd Tx. 1 were outstanding as regards yield of cutched fibre.—C.L.S.

28 **Republic of Ireland.** Twentieth Annual Report of the Minister for Agriculture, 1950-51. Dublin, [n.d.], pp. 188, append. and index pp. 84. [Received 1952]

3arley, pp. 86-9. In trials of 4 varieties at 11 entres, Beorna was again the best malting barley. The Land Rehabilitation Project, pp. 130-4. A rief progress report is given on the different aspects f the project which has, as its object, the reclama- ion of 4.5 million acres of land.—C.L.S.

29 **Canada.** Annual Report of the Department of Agriculture, Ontario. 1950, Toronto. 1952, pp. 1099. [Received 1952]

This report includes the Report of the Minister for Agriculture of the Province of Ontario for the ear ending 31 March, 1951, the 75th Annual Report of the Ontario Agricultural College and Experimental Farm for 1950, the 81st Annual Report of the Entomological Society of Ontario or 1950, the Annual Report of the Statistics Branch or 1950 and the Report of the Ontario Crop Im- rovement Association, the last of which includes number of papers read at the General Crop Meeting.—P.J.B.

30 **United States.** North Central Weed Control Conference. Proceedings of 8th Annual Meeting, 1951. 1951, pp. 126.

mong the papers read at this meeting were the ollowing :

Fundamental concepts of hormonal control of rowth in plants. By L. G. Nickell and G. S. very, pp. 11-14. Notes are given on the role of hytohormones in the physiology and develop- ent of plants. It is considered that, in the USA, ore stress should be laid on fundamental research to plant hormone action than hitherto, to balance e enormous amount of work done on the practical pplication of phytohormones in the field.

Responses of maize to 2,4-D. By E. G. odgers, pp. 57-61. See Abs. 93.

The effects of 2,4-D on barley and oats at fferent stages of growth. By G. Friesen and J. Olson. Brief notes are given on the abnor- alities caused in barley by 2,4-D applications ade at different growth stages.

The seasonal development of Johnson grass (*orghum halepense*) plants. By E. B. Oyer and hers, pp. 62-3. See Abs. 329.

Maize seedling response to 2,4-D as affected certain nutrient salts and metabolites. By R. Hansen and K. P. Buchholtz, pp. 63-6. See s. 91.

Control of annual grasses. By R. S. Dunham, . 67-8. A brief review is given of experiences, inly in Minnesota, of the use of different herbi- les for the control of annual grasses, particularly *Setaria* spp., *Bromus* spp. and *Avena fatua*.

7. Control of Johnson grass. By G. McCall, pp. 68-70. Notes are given on the practical control of Johnson grass by cultivation practices and the use of herbicides.

8. Control of field bindweed (*Convolvulus arvensis*). By D. Finnerty and N. Shafer, pp. 70-1. Notes are given of experiences in Nebraska.

9. Chemical defoliation of cotton. By J. M. Green, pp. 101-2. Notes are given on dust and spray materials for defoliating cotton and on factors affecting the efficiency of defoliants.

10. CMU—A new herbicide. By D. E. Wolf, p. 104. A note is given on the properties of CMU, 3-(p-chlorophenyl)-1, 1-dimethylurea.

11. The use of Chloro IPC as a herbicide. By K. P. Buchholtz, p. 105. A note is given on ClIPC, which appears to have promise as a pre-emergence herbicide for the control of annual grasses.

12. Summary of results with new herbicides. By W. C. Dutton, pp. 106-8. Brief notes are given on a number of new herbicides, including dichloral urea, maleic hydrazide, N-1-naphthylphthalamic acid, MCPA, Chloro IPC, Endothal and CMU.

13. Herbicidal recommendations of the Research Committee for 1952, pp. 108-13. Summarized recommendations are given for the control of perennial, broad-leaved weeds, perennial grass and other weeds and for the use of herbicides in field crops.—P.J.B.

431 **New Jersey** Agricultural Experiment Station. Science and the land. Annual Report 1950-51. Rutgers, 1952, pp. 126.

INVESTIGATIONS REPORTED :

1. Differential effects of post-emergence 2,4-D sprays on several maize hybrids, pp. 37-8. There was considerable variation among a number of maize hybrids in their yield response to 2,4-D applied at given dates, even greater response in their tendency to lodge, but no apparent differences in times of maturity.

2. Boron requirement and metabolism of plants, pp. 73-4. Studies with a number of crop species showed that the relative mobility of B in plant tissues was important in determining their B requirement. Where B can move freely from old to young tissues, the B requirement may be very low.

3. Effects of growth regulators on the nitrogen metabolism of plants, pp. 74-5. Notes are given on the effect of 2,4-D on the protein metabolism of soyabeans and on the water economy of plants. Trials with soyabeans and maize showed that 2,4-D caused much greater injury to plants grown in nutrient solutions with a pH of 4 than those with a pH of 7. No quantitative data of this last effect are yet available, but when available, they may be a basis for adjusting pre-emergence 2,4-D-treatment rates.—P.J.B.

4. Control of water hyacinth, *Eichhornia crassipes* with Dicotox and Weedone 40, two preparations based on 2,4-D, pp. 159-60.
5. Treatment of groundnut and maize seeds with the growth hormone Rootone, pp. 160-1.—E.B.O.

441 **Madras** Department of Agriculture. Administration reports of subordinate officers for the years 1941-48 inclusive and for 1949-50. Madras, 1949-51, pp. 194, 203, 237, 244, 373, 347, 360 and 782. [Received 1952]

442 **New South Wales** Department of Agriculture. Annual Report 1949-50. Sydney, 1951, pp. 62. [Received 1952]

INVESTIGATIONS REPORTED :
1. Oats, maize and red clover rotation experiment, p. 9. It was proved that "over a 6 yr. period as much oats and maize can be harvested from 4 crops, where red clover is included in the rotation as from 6 crops where red clover is omitted."
2. Wheat bulk storage experiments, p. 19. Wheat stored in an earthen, underground pit in 1948 and removed in 1950 had deteriorated, absorbed moisture, become musty and been attacked by weevils.
3. Hybrid maize breeding trials, p. 20. The variety Victory Hybrid (G.H. 134) outyielded Fitzroy, Standfast Hybrid (G.H.96A), and Ensign Hybrid (G.H. 112A). Two new varieties Sunrise Hybrid (N.E.H. 17) and Regal Hybrid (N.E.H. 18) were released from New England Expt Fm.
4. Linseed varietal and yield trials, p. 21. The varieties Zona Buenos Aires, Uruguay, Lin Ameliore, Calar and Plate 115 outyielded Walsh and were satisfactory for oil content and rust resistance.
5. Sunflower varietal trials, p. 21. The variety Advance Hybrid, yielding 1600 lb. seed per ac., was far superior to the Sunrise variety.
6. Chemical killing of potato tops, by spraying the tops with 2% Dinoc, p. 22. In one trial, spraying hastened tuber maturity and facilitated machine harvesting. In other trials, spraying gave (a) a higher proportion of seed size tubers, (b) reduced total yield of tubers, and (c) reduced the percentage of No. 1 grade tubers.
7. Treatment of Sequoia potatoes with thiourea to increase seed yield, p. 22. Both cut and uncut setts were treated with 1% thiourea for 100 min. This adversely affected germination of the cut setts and retarded early growth, but increased the number of stalks per plant.
8. Sugar-beet variety trials on the Murrumbidgee Irrigation areas, p. 24. The highest yielding varieties were U.S.-A737, U.S.-12 and U.S.-33. Sucrose percentages varied from 11.6 to 15.4%.
9. Trials on disease resistance of oats, p. 38. The varieties Oro, Redman, Nordhaugan and Orfed were the most resistant to bunt.—K.L.

443 **New Zealand.** The Official Yearbook 1950. Fifty-sixth issue. Compiled in the Census and Statistics Department, New Zealand. Wellington, 1951, pp. 1122, 15s. [Received 1952]

The following information is taken from the section on agricultural production. Grassland products comprise a high proportion of the farm output in New Zealand. Practically the whole of the internal requirements for agricultural products are met within the country, the only exceptions of note being tropical and sub-tropical products and wheat. Most of the information supplied on crops is extracted from the reports of the Department of Agriculture, or the Department of Scientific and Industrial Research.—M.H.

NEWS ITEMS AND NOTES

INTERNATIONAL

444 INTERNATIONAL AGRICULTURAL ORGANIZATIONS. The European Federation of Agriculture (CEA) has issued in French, Publication No. 5 entitled "Vade-Mecum des principales Organisations internationales tenant compte spécialement de leurs rapports avec l'agriculture et des Organisations agricoles internationales apparentées à l'agriculture." This aide-memoire of 125 pp., edited by A. I. Geisendorf, is published by CEA, Brugg-Argovie, Switzerland, 1951. Its object is to facilitate an understanding of the role and activities of the principal international institutions and international organizations, official and private. It does not claim to be fully comprehensive : certain international organizations are omitted. National institutions are also omitted except where their activities give their work an international importance. Part 1 is devoted to general institutions, government and private, their history, objects, organization etc., while part 2 gives similar information for agricultural organizations, government and private. Part 3 contains a useful list of abbreviations used for the titles of the principal international institutions and organizations which have connexions with agriculture. [From *Herb. Abstr.*]—A.G.G.H.

UNESCO

445 UNESCO BOOK COUPONS have been introduced for the use of institutions and individuals in UNESCO Member States to facilitate the purchase of publications from other countries. The coupons are available in denominations ranging from 25 cents to $100, and also as blank coupons,

nd can be obtained from an appointed address in each articipating country. These addresses, and details of the heme, are given in an 8-page folder supplied by UNESCO oupon Office, 19, Avenue Kléber, Paris-16^e, France. Book oupons can be used to obtain publications in the fields of lucation, science and culture, including books, sub- criptions to periodicals, individual volumes or issues of eriodicals, photocopies and microfilm copies. [From erb. *Abstr.*]—C.L.S.

SA

46 ANTIBIOTICS STIMULATE PLANT GROWTH. Agri- ulture throughout the world, especially in those regions here the growing season is short, may benefit by a dis- overy announced recently at the annual meeting of the merican Institute of Biological Sciences at Cornell Uni- ersity, N.Y., where Dr. L. G. Nickell reported that in- nitely small amounts of antibiotics have been found to imulate plant growth to a significant degree. Working ith 2 lots of maize under greenhouse conditions, Dr. ickell found that, 4 weeks after sowing, the lot which had een given water containing 5 ppm of Terramycin were bout 44 cm. high, on the average, compared with about 36 n. for the control plants watered with tap-water only. he increase in weight was even more remarkable, the dry eight of the above-ground portions of the treated plants eing approximately 5 g., on the average, compared with bout 2.5 g. for the untreated ones. Germination of the eated seed was also better. Considerable growth stim- ation as a result of treatment with antibiotics was also oted by Nickell in experiments with sorrel, radish and nsy. These results of Dr. Nickell with plants throw new ht on the mechanism of antibiotic growth stimulation in imals.—From circular of *Med. and Pharm. Inform. ur., N.Y.*

7 THE AMERICAN CYANAMID COMPANY has announced e appearance of "Aerotil," a hydrolysed polyacrylo- rile similar to Krilium. Aerotil is to be marketed in o forms, as a soluble flake and as a powder. The uble flake contains, it is claimed, a higher concentration active ingredient than any other similar conditioner. e virtues of the new product are reported as similar to se of Krilium. [See *Fld Crop Abstr.* 5 : 1035]. It is phasized that, in general, Aerotil is of little benefit to dy or peaty soils. Soils in good heart as a result of addition of organic matter are not likely to be strik- ly improved by Aerotil. The American Cyanamid Com- ny is embarking on the building of a $50 million plant New Orleans, Louisiana, to produce acrylonitrile from ural gas. *Agric. Chem.* June, 1952.—P.J.B.

SR

TRUDY TIMIRJAZEV INSTITUTE OF PLANT PHYS- OGY. Vol. 7, Part 2, 1951, of this work contains the owing papers: culture of isolated embryos as a poss- means of changing the nature of plants, by F. L. linin; the relationship between the main and branch ots of winter wheat, by I. V. Krasovskaja and V. A. makov; the role of carbohydrates in the synthesis of protein in higher plants, by A. M. Pečenicina; the influence of daylength on the intensity of respiration in plants, by L. P. Zdanova; study of daily periodicity in activity of the root system, by O. M. Trubecova and I. L. Šidlovskaja.—M.H.

449 KOLHOZNOE PROIZVODSTVO 1952, No. 9, contains articles for the farmer, including the following: development of agriculture in hydro-electric centres of the Stalingrad region; increasing productivity of flax collectives; the best fibre-flax varieties; harvesting non-irrigated cotton; the mechanization complex in harvesting sugar-beet; irrigation experiments on collective farms; and a description of the activities of the Siberian Institute of Grain Husbandry.—M.H.

Netherlands

450 A NEW SUGAR-BEET RESEARCH STATION known as the Instituut voor Rationele Suikerproductie has been officially opened at Bergen op Zoom. It has a staff of 40 and is equipped to carry out all the Dutch sugar industry's research work. The new building contains a tarehouse with modern washing and slicing machinery, chemical routine analysis and research laboratories, a flame-photometer analysis laboratory, workshop, library, offices, a permanent exhibition hall, and records and storage rooms. Projects on which the staff are working include: variety and fertilizer trials, plant population studies, processed seed and seed disinfection tests, pests and diseases of sugar-beet, soil structure and mechanization.—*Brit. Sug. Beet Rev.* September, 1952.—K.L.

451 MATERIAE VEGETABILES. This is a new quarterly publication issued by the International Commission for Plant Raw Materials, Zurich. Its scope will include the whole domain of plant raw materials and will bring together papers on the production and investigation of such materials on the one hand and their improvement, processing and utilization on the other. *Materiae Vegetabiles* is to be welcomed as a medium wherein problems connected with these topics may be ventilated and through which all workers in this field may collaborate. Papers in English, French, German, Italian or Spanish will be accepted and should be sent to Prof. Dr. Tobler, Schopfacker, Trogen (App.), Switzerland. The subscription for one volume of 4 numbers is 40 Dutch guilders.—P.J.B.

Portugal

452 SEEDS OFFERED IN EXCHANGE by the Estação Agronómica Nacional at Sacavém include rice (1952 List, Append. I, pp. 14-15), wheat (*ibid.* Append. II, pp. 15-17), soyabean (*ibid.* Append. III, pp. 17-18), and flax varieties (*ibid.* Append. IV, p. 18). Application should be made to the Director, Estação Agronómica Nacional, Sacavém, Portugal. —G.M.R.

French Sudan

453 COLONIZATION CENTRE AT M'PÉSOBA. This centre, established about 10 years ago, now includes 32 native families with 296 cattle and is an almost unique example in

tropical Africa of a successful attempt to anchor African peasants to the land by means of crop rotation and manuring. The centre is used for multiplying the improved seed from the neighbouring agricultural station at M'Pésoba (mainly seed of the cotton variety N'Kourala and the groundnut variety 28-207). Each native family is in charge of 12 ha., 8 of which are under the 4-year rotation: cotton (manured)/millet/groundnuts/fallow (ploughed at the end of the rainy season). This rotation has maintained soil fertility, whereas the unmanured 4 ha. outside the rotation which were sown with alternate crops of millet (*Pennisetum* spp.) and sorghum, continuously, soon became exhausted and had to be fallowed for a long period. *Agron. trop. Nogent* March-April, 1952.—E.B.O.

Nyasaland

454 AGRICULTURAL RESEARCH. The September 1951 issue of the *Nyasald agric. Quart. J.* outlines the main items of agricultural research now being carried out in Nyasaland. The various experimental stations are named and brief notes are given on research projects. The latter include experiments on: soil fertility; cotton breeding and disease resistance; varietal, fertilizer and time-of-planting trials with groundnuts, sorghum, maize, legumes and miscellaneous crops; investigations into the control of various weeds, diseases and pests. [See Abs. 81, 102, 112, 241.]—K.L.

India

455 THREE CROPS A YEAR. At the Rice Experimental Area, Sabour, Sona rice was sown in March and harvested in June, yielding 1074 lb. per ac. The plot was resown with Sona rice which yielded 1246 lb. per ac. in October. A crop of early wheat, No. Br. 319, was then sown on the same plot in November and yielded 984 lb. per ac. when harvested in March. *Curr. Sci.* August, 1952.—W.J.B.

FIELD CROPS

CEREALS

VHEAT

56 JOURNAL OF THE DEPARTMENT OF AGRICULTURE. EIRE. **The influence of rate of seeding on the yields of wheat and oats.** *J. Dep. Agric. Eire* 1950, **47,** 97-103, bibl. 3. [Received 1952]

ate-of-seeding trials with wheat and oats were arried out at the Department's Schools during 947 and 1948. The seeding rates selected were esigned to cover the range from very low to very igh values as compared with the normal seeding ates for the cereals in question. Within these anges the results of the trials showed that the eeding rate of wheat (winter and spring types) nd oats had no significant effect on the yield. bservations carried out during the growing eason, however, indicated that the low rates of eeding gave more vigorous plants, which were etter able to withstand adverse conditions and enerally had a more luxuriant foliage. The eavier rates gave a thicker braird in the early ages, but this effect became less apparent as rowth advanced. The thick stand due to too eavy seeding gave rise to nitrogen deficient symp- oms in many cases. While increasing the rate of eding had no appreciable effect on the plot yield, significantly affected the mean ear weight. The w seeding rates gave the highest mean ear weight nd the two factors tended to be inversely propor- onal to one another. Generally an increase of - lb. in the seeding rate gave a significant decrease the weight of ear and frequently an increase of nly 42 lb. significantly affected ear weight. Since e mean yield per plot remained more or less con- ant, the lower ear weight at the higher rates of eding was evidently compensated by the higher ant population in these plots. The different tes of seeding did not appear to have any effect the size of grain. In the spring-wheat trial in 48 the 1000-grain weight from the four seeding tes was determined, but there was no evidence of y close association between the two factors.— om author's summary.

7 STERTEN, A. K. Høstsaedsdyrking i fjellbygdene i lys av nyere overvintringsstudier. Forsøksresultater fra Statens forsøksgård Løken 1918-40. [**The cultivation of autumn-sown cereals in the uplands (of Norway) in the light of recent overwintering studies. The results of trials at the State Experimental Station at Løken, 1918-40.**] *Tidsskr. norske Landbr.* 1952, **59,** No. 9/10, 269-303, bibl. 17, illus.

A summarized account is given of trials during 1918 to 1940 with winter wheat and rye at Løken in the Trondelag district of Norway. No variety tested was satisfactory in terms of yield dependability from year to year; also, no decisive results were obtained from sowing-date trials, though it was established that under Løken conditions, sowings should not take place later than the first half of August. Attack during the winter by fungal pathogens, particularly *Typhula borealis* and *Sclerotinia borealis*, in upland regions was the most important factor in limiting wheat and rye yields.—P.J.B.

458 MCKAY, H. C. and others. **Wheat production in the semi-arid Pacific Northwest as influenced by methods of handling sweet clover as a green manure crop.** *Agron. J.* 1952, **44,** No. 5, 247-51, bibl. 8. [Idaho Agric. Exp. Sta.]

The inclusion of a sweet clover (*Melilotus alba*)/ grass break in the rotations of the semi-arid winter-wheat areas of the Pacific Northwest of the USA is accepted as a means of building up organic matter and N in the soil. Experiments were begun in 1943 to ascertain the influence on subsequent wheat production of: (a) ploughing in a sweet-clover crop, (b) sub-soiling the clover crop so as to leave a residue as a mulch, (c) the height of the clover before ploughing, (d) removing a crop of hay before ploughing. Ploughing in the sweet clover gave a higher yield of wheat than did mulching. Allowing the clover to grow beyond 22 in. before ploughing caused a reduction in sub-soil moisture and in wheat yields. The reduction of the wheat yield caused by removing a hay crop was offset by the value of the hay. All treatments gave a higher protein content in the wheat grain than did the control plot where a bare fallow replaced clover. Similar results were obtained when a clover-grass mixture was used in place of clover alone. [See *Fld Crop Abstr.* 4 : 622.]—W.J.B.

459 ENTENMANN, F. M. and others. **Cultural methods of establishing grass with sweetclover and the effect of varying the percentage of grass and sweetclover on the crop yield.** *Agron. J.* 1952, **44,** No. 10, 514-16, bibl. 6. [Washington Agric. Exp. Sta., Pullman]

In trials during 1949-51 on the use of sweet clover (*Melilotus alba*) and Bromar mountain brome grass (*Bromus marginatus*) for controlling soil erosion in Washington, these 2 species were sown individually in 6 different row combinations in rows 6 in. apart, the stands remaining down from the spring in the year of establishment until the following year, the stands being harvested when the clover was in the early-bloom stage. The highest grain yields of wheat were obtained when the wheat followed the sowing of 1 row of *M. alba* per 2 rows of *B. marginatus*. The lowest wheat yields followed the sowing of *M. alba* alone, and 1 row of *M. alba* per 1 row of grass, though in no cases were the differences significant. Where wheat followed the sowing of *M. alba*, alone, the protein content of the grain averaged 13.0% compared with 10.3% for wheat grown following the use of 1 row of *M. alba* per 3 rows of grass, the difference being highly significant. From the results of these trials, it is concluded that under conditions where wheat grain with a low protein content is required, the cover crop preceding the wheat should contain a high proportion of grass to sweet clover.—P.J.B.

460† Satarova, N. A. [**Comparative study of the development of the absorbing surface of spring wheat roots under a ley system of farming.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1952, **84,** No. 2, 373-6, bibl. 9. [Timirjazev Inst. Pl. Physiol.]

The author studied this subject with the spring wheat variety Lutescens 62 grown under shelter-belt conditions and also in the open steppe of the territory of the Dokučaev Institute of Agriculture, Voronež. There are tabulated data of the growth phases of wheat in relation to area of absorbing surface of the seminal and nodal roots of plants grown: (1) within a forest belt, (a) on ploughed fallow, (b) following a 1-year ley; and (2) in the open steppe, also on ploughed fallow and after a 1-year ley. Yields were greater from the wheat grown in (1), both (a) and (b), compared with those grown in (2).—M.H.

461 Pisarev, V. [**Methods of increasing spring wheat harvests in the non-chernozem belt.**] [Russian] *Kolhoz. Proisvod.* (*Collect. Fm Prod.*) 1952, **12,** No. 10, 22-4.

A popular account is given of cultural measures necessary for the production of spring wheat and there is information on yields obtained in various collective farms of the non-chernozem belt.—M.H.

462 Maliani, C. Il grano, coltura sarchiata. [**Wheat, a hoed crop.**] *G. Agric. Domen.* 1952, **62,** No. 41, 309. [Ist. Tec. Agr., Lonigo, Vicenza, Italy]

Hoeing, besides controlling weeds, improves soil structure so that the air penetrates the soil, the wheat roots develop deeper, and there is less danger from lodging. To facilitate machine hoeing, the appropriate distance between wheat rows was studied for several years. The best method found was to sow wheat along twin rows, the distance between 2 pairs of rows being 33 cm. and between the 2 rows of a pair 7 cm. Wheat crops should be repeatedly hoed between January and April. Hoeing is efficiently carried out with a Planet machine, worked by 2 men, which effects also a slight earthing up.—E.B.O.

463 Grillot, G. and others. Les résultats obtenus à la ferme expérimentale de Fez dans des essais culturaux combinés de variétés, d'époque et de densité de semis de blés tendres. [**The results obtained on the experimental farm at Fez (Morocco) from combined trials with soft wheats of varieties, sowing date and seed rate.**] *Terre maroc.* 1952, **26,** No. 275, 363-9. [Cent. Rech. Agron., Rabat]

The results from these trials, carried out on manured, clayey-siliceous soil during 1947-51, showed that: (a) seed rates of 100 and 150 kg./ha. gave equivalent yields; (b) because of insufficient rainfall in the second half of November, which generally delayed sprouting in the wheat crops sown at the middle of that month, these crops matured approximately at the same time as those sown at the middle of December; (c) when rainfall was adequate, there was an advantage in sowing early, particularly in the case of the late variety 335; (d) the varieties 2511, 335 and 982 gave the highest yields. The variety 2511 is recommended for late sowing.—E.B.O.

464 Oliva, A. Successi e prospettive della granicoltura montana. [**Success and prospects of mountain wheat cultivation.**] *Humus* 1952, **8,** No. 9, 10-13.

Information is given on wheat cultivation in the Italian mountains, an area of about 1,100,000 ha. where wheat yields are 8 to 16 q./ha. The upper limit of cultivation is 1100-1200 m.a.s.l. The present trend is towards increasing wheat production by improving the unit yield, and not by extending the cultivated area. The low yields are determined by the nature of the soil and by the low resistance to cold and rust of many of the varieties employed. Towards the upper limit of cultivation, the vegetative cycle of wheat is 10-12 months. In the environment of the mountains, mutations and natural crosses often occur in wheat. The following varieties are recommended: Est 72, for regions between 700 and 1150 m.; Rieti 11 and 210, for medium clayey soils; M.C. 245 and (Est × M.C.), for soils of high fertility; Frassineto, Vivenza and Autonomia, for the transition area from hill to mountain.—E.B.O.

465 Trentin, A. Grani precoci e gelate tardive. [**Early wheat varieties and late frosts.**]

Agricoltura d. Venezie 1951, **5,** No. 10, 510-19.

he climate in the Veneto, Italy, during the winter f 1950-1 was exceptional, being characterized by igh rainfall, relatively mild temperatures and idden frosts. These frosts, particularly those in larch, caused serious damage to all the wheat arieties examined. The effect of frosts at the end f December, in January and in March on the ifferent varieties grown, and the way those arieties recuperated by growing new tillers are escribed. The March frosts appeared to damage specially the varieties Mentana, Quaderna and enza Nome. It was confirmed that early wheat arieties should be sown in this region between) October and the first days of November at the ıte of 170 to 200 kg. of seed/ha.—E.B.O.

6 WALKER, A. J. K. **Results of wheat variety trials, 1948-51** [**in S. Australia**]. *J. Dep. Agric. S. Aust.* 1952, **56,** No. 2, 60-9.

7 PENDLETON, J. W. and others. **Winter wheat variety trials 1940-1950.** *Bull. 549 Illinois agric. Exp. Sta.* 1952, 319-43, illus.

arieties which have proved of superior performıce during the trial period and have become dely grown in Illinois were : Pawnee, Fairfield, ackhawk, Vigo and Royal. Among soft wheats, line, Seneca and Butler appear promising, as do estar, Minter and Triumph among hard wheat rieties. In general, soft-wheat yields have nded to increase over the trial period, while those hard wheats have remained constant, or have len slightly. The more recently-produced soft heats have equalled, or surpassed, the hard heats in yields in both central and northern inois. In 56 out of 74 trials, bearded-wheat rieties have outyielded beardless varieties, ough of recent years, there have been no signifiınt differences between the yields of these two pes.—P.J.B.

3 JOURNAL OF THE DEPARTMENT OF AGRICULTURE. EIRE. **Cereal variety trials at Department's schools** [**Eire**] **in 1948 and 1949.** *J. Dep. Agric. Eire* 1950, **47,** 104-18. [Received 1952]

sults are given of variety trials on wheat, oats l barley.—K.L.

) GADEA, M. Tres años de experiencias con nuevas variedades de trigo. [**Three years of trials with new wheat varieties.**] *An. Inst. Invest. agron.* 1952, **1,** No. 1, 1-182. [Cent. Cerealicult., Madrid]

account is given of widely scattered trials rried out in Spain for the last 3 years to study the ıptation and yield of many new wheat varieties, ıpared with the varieties usually grown. Some of the varieties tested had been selected at the above centre, whilst many others had been introduced from Italy and French Morocco. Although definite conclusions cannot yet be drawn, the combined results from these trials allow certain new varieties to be recommended for particular regions.—E.B.O.

470 DIONIGI, A. Due grani nuovi. [**Two new wheat varieties.**] *G. Agric. Domen.* 1952, **62,** No. 36, 270.

Elia and Ovest are 2 new wheat varieties bred at the Stazione di Granicoltura of Rieti, Italy. Elia is early and particularly resistant to rust. It is also resistant to cold, lodging and "stretta" (shrivelling of the grain by the sun) and is suitable for soils of medium fertility. Ovest, obtained from crossing Est, the accepted variety for the mountains, is particularly suitable for those mountain regions where conditions are not extreme.—E.B.O.

471 BALDONI, R. Prova quadriennale su varietà di frumento. [**A four years' trial with wheat varieties.**] *Ann. Sper. agr.* 1952, **6,** No. 5, 1235-65, bibl. 1, illus., English summary p. 1265. [Ist. Agron. Gen., Univ. Bologna, Italy]

The trial described was carried out on deep, clayey, fertile soil at Corticella, near Bologna, in 1947-51, to compare new wheat varieties with established varieties. The 37 varieties tested, and their parents, are named. Tabulated results showing the biologic characteristics and the yield of the varieties are given for each year. A summary of the results from the 4 years is also tabulated. Although some of the new varieties tested showed a definite improvement over the control varieties, it was confirmed that the general improvement in wheat cultivation during the last 10 years in Italy is small compared with that achieved in the previous 30 years.—E.B.O.

472 FORLANI, R. I migliori frumenti. [**The best wheat varieties.**] *Humus* 1952, **8,** No. 9, 6-9, illus.

Information is given on the best wheat varieties grown in the plain and hills of northern Italy. Beside the varieties Mara and 0.10 which are suitable for soils of high fertility [see *Fld Crop Abstr.* 5 : 353], the following varieties are recommended for cultivation under conditions below the optimum : Fortunato, Freccia, Grifo, S. Pastore, Funo, Impeto, Aquila and Carme. For soils of low fertility in the plain or the hills, the varieties Tevere and Fiorello are recommended.—E.B.O.

473 TELLES, Inés P. de Soares, and CEPERO, P. Calidad industrial de 26 variedades de trigo inscriptas en el registro oficial. [**Industrial quality of 26 wheat varieties inscribed in the**

official register.] *Bol. Prod. Fom. agric.* 1951, **3,** No. 23, 2-17. [Dir. Prod. Granos y Forraj., Minist. Agric. Argent.]

The article presents the tabulated results from analyzing 1068 samples of 26 wheat varieties [12 hard, 14 semi-hard] grown in 1948-9. The material is arranged according to the 6 sub-regions, 3 of them again subdivided, of the Argentine wheat-growing region.—G.M.R.

474 TÉLLEZ, R. M. Ensayos comparativos de rendimientos de trigos híbridos. [**Comparative yield trials with wheat hybrids.**] *An. Inst. Invest. agron.* 1952, **1,** No. 1, 183-215. [Cent. Cerealicult., Madrid]

An account is given of the trials carried out since 1949 at the above Centre and in several other Spanish districts, mostly on non-irrigated land, to compare the wheat hybrids bred at the Centre with established local varieties. A list is given of the hybrids tested, with their parentage. Results are tabulated. In the northern regions, both the hybrids 100-30 and 100-38 (Aragón Z- 2-470 × Ridit), gave good results, but the variety Schribaux J-1 from France was best. In the southern regions, 100-30, and other hybrids of the same parentage, yielded consistently well. Here the control varieties Candeal Alcalá and Aragón 0-3 also gave good results. In particular, in Cáceres Province, the local variety Cabezorro proved to be well adapted, yielding considerably more than the hybrids tested. In Badajoz, 100-30 and 100-38, more so the former, yielded more than the control. In Ciudad Real, the hybrid 154-17 [(Yeomán 2 × Krelof) × Gluyas Early] yielded more than Mentana, the early variety mostly grown in this area. The programme for the 1951-2 trials is given.—E.B.O.

475 GURČENKO, V. S. [**The best varieties of spring wheat under irrigation in Siberia.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 10, 14-19.

Spring wheat is the primary grain crop in Siberia where it occupies more than 50% of the sown areas. Low yields are sometimes obtained, especially in the south-west. In 1952, the USSR Academy of Sciences investigated the possibility of irrigating the Kulundinsk Steppe, the most fertile area of Siberia. At the same time records were made of grain yields from irrigated sowings of different varieties of spring wheat grown in the Altaĭ, Krasnojarsk and Tubinsk regions. These records showed that the best varieties under irrigation are : Milturum 553, Smena, Albidum 3700 (each bred at the Sibirsk Sci. Res. Inst. for Grain Husbandry) ; Kitchener (adapted to the foothill area of the steppe on dark-chestnut soils in Hakassk Autonomous Province) ; and Iskra (bred at the Čeljabinsk State Breeding Station). For the successful production of these varieties under irrigation in Siberia a rotation of crops including a herbage mixture (lucerne/*Agropyron*) is recommended. Details of the necessary cultural measures are supplied.—M.H.

476 PRUCKOVA, M. G. [**Varieties of winter wheat for irrigation farming.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 11, 41-9. [State Comm. Var. Trials, Grain, Oil and Herb. Pl.]

In Central Asia and Transcaucasia, winter wheat has for a long time been cultivated under irrigation. Yields are good, but protein content of the grain is frequently lowered by the irrigation. Selection of winter wheat for growth under irrigation has been studied very little (with the exception of work carried out in the Azerbaĭdžan and Armenian SS Republics and in Dagestan Autonomous SSR) because varieties which have been bred for unirrigated areas are used and they respond well to waterings. The value of Erythrospermum 118 (bred at the Agricultural Institute of the South-East USSR) grown under irrigation in the Saratov Province is recorded and there is information on the characteristics and yields of Odesskaja 3, Stepnaja 135, Uljjanovka, and others, grown in various localities of the south-eastern regions, and in northern Caucasia.—M.H.

477 VOĬTČIŠIN, N. V. [**New rust-resistant varieties of winter wheat for the foothills of northern Caucasus.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 9, 10-14. [North Osetin State Sel. Sta.]

The climate of this region favours the widespread incidence of bacterial and fungal infestations in winter wheat. An epiphytotic of rust, especially yellow and brown rust (*Puccinia glumarum* and *P. triticina*), appears almost every year in the north Caucasus. There is also much lodging in wheat crops. In 1947 the research institutes of this area initiated studies of wheat types resistant to both fungal attack and to lodging. So far, the most resistant types produced by the North Osetin Station are : Jubileĭnaja Osetii, Osetinskaja 3, and Osetinskaja 4. Tabulated data show the consistently higher grain yield obtained from these varieties in 1950-1 compared with that from the varieties Zemka, Krasnodarka and Kubanskaja 133 on several collective farms in zones grouped as follows : (1) superabundant moisture ; (2) high moisture ; and (3) intermittent moisture. Jubileĭnaja Osetii and Osetinskaja 3 and 4 have straw which is somewhat longer than that of other varieties, but these 3 types are, nevertheless, resistant to lodging and suitable for combine harvesting. In the collective farms of North Osetin ASSR, these three varieties together occupy more than 1300 hectares.—M.H.

478 Owen, P. C. **The relation of water absorption by wheat seeds to water potential.** *J. exp. Bot.* 1952, **3,** No. 9, 276-90, illus. [Rothamsted Exp. Sta., Harpenden, Herts.]

The progress of water absorption by wheat grains was studied by supplying water in the vapour phase, at controlled potentials. At a potential of —250 metres of water, the curve for water uptake against time shows exponential approach to equilibrium moisture content. Living and dead seeds behave similarly until germination effects are apparent. Water uptake in the early stages is probably due to physical rather than physiological processes. When germination occurs, it causes an exponential increase in the rate of water uptake. At higher potentials, up to zero, the uptake curves for dead seeds depart from the simple exponential relationship; in addition to the exponential component, there is a component of which the rate increases with time to a constant rate. The first component may represent the physical process of imbibition by the starch, and the second the initiation and progress of starch hydrolysis. A parameter *a* of the formula derived for the curves is interpreted as representing the diffusivity of water vapour in the seed material, depending upon the physical properties and dimensions of the seed.——Author's summary.

479 Gassner, G. and Baumgarten, G. Das osmotische Verhalten keimender Weizenkörner. [**The osmotic value of germinating wheat.**] *Züchter* 1952, **22,** No. 2, 66-79, bibl. 33, illus. [Tech. Hochschule Braunschweig]

The osmotic pressure of germinating wheat seeds was investigated to determine whether any relationship existed between osmotic pressure of the germinating seed and specific varietal characteristics. No relationship existed between the osmotic pressure of the germinating seed and the winterhardiness or drought resistance of a variety, but there was a relationship with dormancy. Without exception, varieties having a high osmotic pressure in the germinating seed had a short period of dormancy, and *vice versa*.—D.B.

480 Machacek, J. E. and Wallace, H. A. H. **Germination of treated and untreated seed of wheat, oats and barley of different commercial grades.** *Sci. Agric.* 1952, **32,** No. 11, 597-602, illus. [Dom. Pl. Path. Lab., Winnipeg, Manitoba, Canada]

Studies were made of the germination of untreated seed samples and of samples treated with Ceresan M (7.7% ethyl mercury p-toluene sulfonanalide) of 6 grades of wheat, 7 of oats and 6 of barley, representing a range of market qualities of each type of seed. Seed treatment increased the germination by several percent in all grades. In wheat, seed treatment increased germination more in high-grade than in low-grade samples; in oats, this trend was reversed, while in barley, seed treatment tended to increase germination more in the intermediate grades than in the lowest and highest grades. Storage of treated seed for 30 days at room temperatures markedly decreased germination in wheat seed in the highest and lowest grades, but had little effect on barley or oats.—P.J.B.

481 Linskens, H. F. Untersuchungen über die Änderung des physiologischen Verhaltens von Weizen-und Gerstensamen nach Heisswasser-Bädern. [**Physiological changes in grain of wheat and barley after hot water bath treatment.**] *Züchter* 1950, **20,** No. 5/6, 168-87, bibl. 137, illus. [Received 1952] [Univ. Köln, Germany]

The hot water bath is used for seed disinfection to destroy the mycelium of *Ustilago tritici* and *U. nuda*. The caryopsis was placed in water at 45°C. for 2 hr., after which it was dried. Metabolism and respiration were studied.—D.B.

482 Školjnik, M. Ja. and others. [**Pre-sowing hardening of plants to drought by steeping the seeds in a solution of boric acid.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1952, **84,** No. 4, 841-4, bibl. 5. [Komarov Bot. Inst. Acad. Sci. USSR]

Reference is made to Henkel's method of pre-sowing hardening of plants to drought [*Herb. Abstr.* 9 : 130] and to Školjnik's work [*Herb. Abstr.* 12 : 169] in which it was claimed that the hardening effect was the total result of (1) soaking seed in water and subsequent drying, and (2) the action of microelements. It is postulated that if the experimental seed is soaked not in water but only in the solution of the requisite microelements and subsequently dried, this would increase the effectiveness of the method for presowing hardening of seed to drought. It is further postulated that the best results would be obtained by using a solution of boric acid because (as maintained by Školjnik) boron is specially necessary to plants growing under high temperature, and thus an indirect indication would be given of the capacity of this element to increase the plant's resistance to such temperature. The following experiments were made in 1950-1 to test these hypotheses. The experimental plants were spring wheat, barley and sunflower, and the treatments compared were: steeping the seeds in solutions of boric acid, manganese sulphate and zinc sulphate; dusting the seeds with boro-magnesium (containing 2.6%B); and the application of boro-magnesium to the soil. Of the treatments tested, steeping the seeds in a solution of boric acid gave the largest increase in seed yield of Lutescens 62 spring wheat, of Nutans barley, and of sunflower. With sunflower all treatments tested resulted in an increased percentage of oil in the seeds: in the steeping treatment using boric acid, the yield of oil was increased by 15% compared with untreated control.—R.P.J.

483 Longchamp, R. and others. Action de diverses hétéro-auxines désherbantes sur le rendement des céréales. [**Effect of several herbicides of the heterauxin type on the yields of cereals.**] *C. R. Acad. Agric. Fr.* 1952, **38,** No. 2, 81-5, bibl. 2.

Eight varieties of wheat were examined at the stage of least susceptibility, that is, during elongation and before filling out of the ear. The experimental details and the results are summarized in a table which gives the varieties treated, the products employed, the rate at which they were applied and the increase or decrease in yield compared with a control. The results show that varieties differ in their susceptibility and consequently there should be considerable flexibility in prescribing herbicides for different varieties of wheat.—D.B.

484 Longchamp, R. and others. Sur les variations de la sensibilité des blés d'hiver à l'égard des hétéro-auxines désherbantes au cours des diverses phases de leur évolution. [**Variations in the sensitivity of winter wheat to herbicides of the heterauxin type during the various stages of plant development.**] *C. R. Acad. Agric. Fr.* 1952, **38,** No. 2, 74-80, bibl. 1.

The sensitivity of winter wheat to the sodium salt of 2,4-D, the ethyl ester of 2,4-D, and the sodium salt of MCPA is not identical at all stages of plant development. The sensitivity is lowest at the end of tillering and beginning of elongation and greatest at the filling out of the ear. At this stage the plant is more particularly sensitive to the ester which causes sterility. From a practical standpoint one need not be concerned about the stage of plant development at which the herbicide is applied if the sodium salt is used and so long as it is applied after tillering has begun; but, if the ester is used, the stage of development of the plant has to be taken into account.—D.B.

485 Costa, J. J. and Danfiño, D. S. El hexaclorobencene o "66". Su química y acción contra la caries o carbón hediondo del trigo. [**The chemistry and fungicidal action against stinking smut of wheat of hexachlorobenzene or "66".**] *Idia* 1952, No. 55, 16-22, bibl. 16, illus.

Owing to the toxicity of organo-mercuric seed-disinfectants, investigations have been made in Argentina into the possibility of using hexachlorobenzene as a seed-disinfectant against bunt or stinking smut (*Tilletia caries*) of wheat. An experiment is described in which wheat grain was artificially infected with *T. caries* and treated, before being sown, with preparations of C_6Cl_6, varying in concentration from 1 to 10% of active principle. C_6Cl_6 had no effect on the germination of the wheat. A preparation in powder form, containing 6% C_6Cl_6 and applied at a rate of 200 g. per 100 kg. of seed, gave effective control of *T. caries*.—W.J.B.

486 Pizzorno Pereira, J. and Fischer, G. J. Ensayos chacareros complejos. [**Complex experiments on farms.**] *Arch. fitotéc. Uruguay* 1952, **5,** No. 1, 137-48, bibl. 3, illus., English summary p. 177.

A multi-factorial experiment, intended to be a model for experiments on commercial farms in Uruguay, is described. The factors involved were 16 varieties of wheat, 4 different treatments with N and P, and 4 different treatments with seed-disinfectants. All seeds were inoculated with spores of stinking smut (*Tilletia caries*). Two of the five replicates were sprayed with calcium sulphide against black rust (*Puccinia graminis*) and brown rust (*P. triticina*). The average yield per ha., the hectolitre weight, the response to manurial treatments, the date of maturity and the resistance to disease of each variety are tabulated. Light attacks of *P. graminis* and *P. triticina* were significantly reduced by calcium sulphide sprays. The variety D Q 3 (150) 2 proved most resistant to *P. graminis*. While the normal doses of the seed disinfectants, Tritisan and Granosan No. 1, were effective against *T. caries*, excessive doses reduced yields significantly. Even where no seed disinfectant was used, only 5% of the plants of variety D Q 3(150)2 were attacked by *T. caries*. Throughout the experiment D Q 3(150)2 was outstanding for health, yield and specific weight of grain.—W.J.B.

487 Rusakova, A. A. and Raskin, S. E. [**Determination of the toxicity of disinfectants used against bunt** (*Tilletia tritici*) **in the forming ear of wheat.**] [Russian] *Selek. Semenovod. (Sel. Seed-Gr., Moscow)* 1952, **19,** No. 3, 68-72, bibl. in text. [Samoĭlov Sci. Res. Inst. Ferts, Insecticides and Fung.]

The evaluation of preparations according to their toxicity to bunt of wheat is possible not only in the phase of milk ripeness, but also in the phase of initiation of earing in the growing ovary, which emits when crushed the specific odour of trimethyl amine characteristic of bunt. The evaluation of the disinfectants is accelerated in the latter case by 15 to 20 days. It is possible to evaluate disinfectants even during the earlier development of the plant, e.g. during the booting phase in the rudimentary ear, by detecting mycelia and chlamydospores microscopically. A reliable indication of nfection of the future ears of wheat with bunt is he presence of chlamydospores in the spikelet ubercles of the forming ear at the height of the hird node.—R.P.J.

88 VANDERWALLE, R. Les rouilles du froment. [**The rusts of wheat.**] *Rev. Agric., Brux.* 1952, **5,** No. 3, 211-18.

An account is given of the various types of wheat usts, *Puccinia* spp., present in Belgium. The nfluence of different factors on the spread of rust and the reasons causing a variation in the intensity of the disease are discussed. Although it is theoretcally possible to control wheat rust by means of copper and sulphur fungicidal dusts, this is not practicable on a large scale. Good cultural nethods, the avoidance of late sowing, heavy seed ates, heavy applications of nitrogenous manures, he eradication of susceptible weed hosts and the use of resistant cereal varieties all aid in reducing he damage to cereal crops caused by rusts.—K.L.

89 RAŠEVSKAJA, V. F. and NILOVA, V. P. [**The influence of catalase activity on the resistance of wheat to *Puccinia triticina*.**] [Russian] *Izv. Akad. Nauk SSSR (Rep. Acad. Sci. USSR)* Ser. Biol. 1952, No. 4, 63-7, bibl. 8.

See *Pl. Breed. Abstr.* 23 : 253.]

90 MARTINEZ, E. J. Estimacion de los daños causados por las royas de los cereales (*Puccinia triticina* y *P. coronata avenae*). [**Evaluation of the reduction of yield caused by the cereal rusts, *Puccinia triticina* and *P. coronata avenae*.**] *Rev. Invest. Agric., B. Aires* 1951, **5,** No. 4, 465-82, bibl. 45, illus. [Inst. Fitotec., Castelar]

n exact method of estimating damage caused by ne cereal rusts is of value in the study of varietal esistance to rusts and of the relative virulence of ifferent strains of the fungi. Experiments carried ut in 1948-9 are described in detail. The oat ariety Richland and 8 varieties of wheat were nployed. In the case of each variety, the degree f incidence of *Puccinia triticina* or *P. coronata* as measured according to the scale of Durrel and arker and the yield of grain recorded. The esults from each variety were compared with those btained on parallel control plots on which the ttack of rusts was prevented by applications of lcium polysulphide. On the average, each increase of 10% in the incidence of rust resulted in a duction of 4.5% in the yield of grain.—W.J.B.

01 ÅKERMAN, Å. and others. Vid Sveriges Utsädesförening samlade erfarenheter från 1951 års svartrostangrepp å vete. [**Experiences at the Swedish Seed Association during the 1951 epidemic of black stem-rust on wheat.**] *Sverig. Utsädesforen. Tidskr.* 1952, **62,** No. 2, 76-151, bibl. 56, illus., English summary pp. 149-51.

The history of black stem-rust (*Puccinia graminis tritici*) in Sweden and an account of work done in other countries on breeding resistant varieties of wheat is given. Data are also given of varietal differences in reaction to black stem-rust during the epidemic year 1951, at Svalöf and at 4 branch stations of the Swedish Seed Association. A close positive correlation was found between the degree of infection and the resultant decrease in grain yields. No satisfactory resistance was found in winter-wheat varieties ; varieties with moderate resistance were : Sv. 01580, Skandia III B, Aros, Robur and Odin. The most resistant spring-wheat varieties were : Pondus, Dala, Hallands, Brons, Fylgia I, and Fylgia II, all of which showed a far greater degree of resistance than did any of the winter wheats.—P.J.B.

492 PAINTER, R. H. and others. **Hessian fly resistance of Ponca wheat.** *J. econ. Ent.* 1952, **45,** No. 5, 778-83, bibl. 6, illus. [Kans. Agric. Exp. Sta., Manhattan]

The Ponca wheat variety (Kawvale × Marquillo) × (Kawvale × Tenmarq), released to farmers in 1951, has been bred for resistance to the hessian fly, *Phytophaga destructor*. Ponca has been resistant to the hessian fly wherever grown during 1941-51 and in this period it had 2% of plants infested by the hessian fly in 27 tests in the hard-wheat area of Kansas and 6% in 25 tests in the soft-wheat area of Missouri, while the susceptible Tenmarq variety had 75% and 85% infested plants, respectively. Ponca has greater resistance to hessian fly and leaf rust, but less bunt resistance and winterhardiness than Pawnee, the wheat variety most commonly grown in eastern Kansas. It does not differ significantly from Pawnee in most other characteristics of economic importance.—E.B.O.

493 ATKINSON, R. E. **Studies on viruses of cereal grains.** 1952, pp. 83. [Univ. Missouri]

Studies were made of 5 virus diseases of cereal grains : western wheat mosaic, barnyard grass mosaic, stunt of wheat, green mosaic of wheat and barley false stripe. The greenbug, *Toxoptera graminum*, transmitted the virus of western wheat mosaic to 44% of 273 plants exposed, and the apple-grain aphid, *Rophalosiphum prunifoliae* transmitted it to 38% of 322 plants. In repeated tests there was no evidence for seed or soil transmission. The damage caused by western wheat mosaic may be reduced by delaying planting until conditions are unfavourable for the development of the insect vectors. [From *Diss. Abstr.*]—C.L.S.

494 VASUDEVA, R. S. and HINGORANI, M. K. **Bacterial disease of wheat caused by *Corynebacterium tritici* (Hutchinson) Bergey et al.** *Phytopathology* 1952, **42,** No. 6, 291-3, bibl. 9, illus.

In Delhi State, *C. tritici* is estimated to cause average wheat-yield reductions of 1 to 2%, though reductions may be as high as 50% in individual cases. *C. tritici* was shown to be unable to infect wheat in the absence of the earcockle nematode, *Anguillulina tritici*. Control was best achieved by the removal of earcockles from seed samples by sedimentation or flotation.—P.J.B.

495 BERTSCH, K. Vom Ursprung der hexaploiden Weizen. [**The origin of hexaploid wheat.**] *Züchter* 1950, **20,** No. 1/2, 24-7. [Received 1952] [Ravensburg, Germany]

496 LUNDEGÅRDH, H. **Properties of the cytochrome system of living wheat roots.** *Nature, Lond.* 1952, **169,** No. 4313, 1088-91, bibl. 14. [Inst. Pl. Physiol., Uppsala]

The properties of the cytochrome system of wheat roots have been studied under normal conditions of growth and under the influence of various inhibitors affecting single cytochromes, or enzyme systems linked to them. Full details of this work are to be published in *Ark. f. Kemi*. [*Swed. Acad. Sci., Stockh.*]—M.H.

497 GALJČENKO, I. N. [**The role of light in lodging of wheat induced by the roots.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1952, **84,** No. 5, 1069-72, bibl. 3, illus.

Results are reported of experiments with spring wheat grown on the Eršovsk irrigated experimental grounds of the Agricultural Institute of South-East USSR. Light plays an important part not only in lodging which results from culm weakness, but also in lodging which is due to poor anchoring by the roots. As a result of better illumination in sparse stands as compared with dense ones, the plants develop a more powerful root system which increases resistance to lodging.—R.P.J.

498 KOLOSOV, I.I. and ŠALDENKOVA, S. F. [**Concerning the role of the embryonic and nodal roots in supplying the plant with mineral nutrients and water.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1952, **85,** No. 1, 211-14, bibl. 3.

Results are reported of experiments with branched wheat, designed to elucidate the role of the embryonic and nodal roots in the general nutrition of the plant and to evaluate their absorbing activity. Individual rootlets and groups of embryonic and nodal roots of cereals which absorb mineral substances supply these simultaneously to both the main and the lateral shoots of the plant. Under normal conditions of plant development, the nodal roots play a large part in plant nutrition: they effect a considerable improvement in the P supply, not only of the tillers but also of the main stems. The absorbing activity of the roots changes with the growth of the plant. In the experiments reported, the intensity of the activity of the nodal roots in the shooting phase was approximately twice as high as in the tillering phase.—R.P.J.

499 SKRIPČINSKIĬ, V. V. [**The number of germinal roots which develop during germination of the seeds of spring and winter varieties of wheat and barley.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1951, **80,** No. 6, 981-3, bibl. 6. [Stavropol Agric. Inst.]

Data from an experiment show the number of roots produced each day following the germination of seeds of winter and spring varieties of wheat. On the tenth day the winter and spring varieties did not differ in their number of germinal roots: they had on the average approximately 5 per seedling. But, in the dynamics of the formation of roots during the first few days, there was a decided difference, the roots of the spring varieties in the majority of cases appearing more rapidly than in the winter varieties: this was particularly marked on the fourth and fifth days. Analogous observations during the germination of winter and spring varieties of barley gave a similar picture with the only difference that on the tenth day the spring varieties had on the average 6.7 and the winter varieties 5.9 roots per seedling.—R.P.J.

500 GUNAR, I. I. and KRASTINA, E. E. [**Physiological and biochemical processes in relation to phase of development in spring wheat.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1952, **86,** No. 1, 185-8, bibl. 25.

501 POHJAKALLIO, O. **On the effect of light and fertilizing on the energy economy of winter wheat.** *Physiol. Plant.* 1952, **5,** No. 3, 409-18, bibl. 7. [Pl. Path. Inst., Univ. Helsinki, Finland]

Wheat was grown in pots in a room with windows 1.5 m. high and 3 m. wide, facing south-east. The pots were placed at different distances from the windows so that mean light intensities were 57, 48, 41, 36, 33 and 25% of that outside the windows. Two series of trials were run, the first from 14 February—18 March and the second from 3—28 April. The plants were kept under long and short photoperiod treatment. In the first trial, the short photoperiod day lengths varied from 9.1 to 12 hr., while the long photoperiod treatments consisted of he normal day lengths, plus night illumination by luorescent lamps of 700 lux. In the second trial, he short-day treatments were 10 hr. of natural llumination daily, while the long photoperiod reatments were the natural day of 13.3 to 15.6 r., plus night illumination as above. Manurial reatment increased the green-weight yields of the lant shoots more under long than under short hotoperiods. With unmanured plants, no clear ffect of day length was noted. The effect of light ntensity followed a similar course to that of hotoperiod. The dry-matter content of the plant hoots decreased as light intensity decreased, this ffect being more marked in unmanured than anured plants. The dry-matter content of the hoots was much greater in unmanured than in anured plants at high light intensity ; at low ight intensities, no clear differences in dry-matter ontent were noted. The dry-matter yields of anured plants were much greater than in unanured plants, this effect being enhanced by high ight intensities and long photoperiods. The dryatter yield of the roots was considerably greater in nmanured than in manured plants ; high light ntensities and long photoperiods both tended to ncrease the dry-matter yield of roots in manured nd unmanured plants. Lengthening the photoeriod decreased the root/top ratio in manured lants, while different light intensities had little ffect on this ratio. In unmanured plants, the oot/top ratio was much higher than in manured lants; in unmanured plants, increasing light inensities increased root/top ratios.—P.J.B.

02 AVILA, A. and MIKENBERG, N. Estudio de la correlacion posible entre las propiedades fisicas y principales constituyentes quimicos del gluten. [**Studies on the possible correlation between the physical properties of gluten and the proportions of its chief chemical constituents.**] *Rev. Invest. Agric., B. Aires* 1951, **5,** No. 4, 393-423, bibl. 13, illus. [Inst. Fitotec., Castelar]

or the first time the chemical constituents and hysical properties of 99 Argentinian varieties of heat have been thoroughly investigated. The ercentage of glutenin, gliadin and globulin in the rain and the physical properties of each variety of heat are tabulated. It was not found possible to orrelate the plastic qualities of the gluten with e proportions of glutenin and gliadin present. he varieties of wheat are classified according to e plastic qualities of their gluten.—W.J.B.

03 REFAI, F. Y. and MILLER, B. S. **The determination of pantothenic acid in wheat.** *Cereal Chem.* 1952, **29,** No. 6, 469-75, bibl. 14. [Kansas Agric. Exp. Sta., Manhattan]

04 ÅSLANDER, A. **Standard fertilization and the quality of crops.** *Soil Sci.* 1952, **74,** No. 6, 431-42, bibl. 8. [Roy. Inst. Technol., Stockholm, Sweden]

Trials were laid down on 50 farms at different locations in Sweden to test the assumption that crops on acid soils are always inferior to those on neutral soils. Winter and spring wheats and winter rye were grown on plots receiving a standard dressing of sufficient N, P and K fully to satisfy the growth requirements of the crops and applications of Ca sufficient to satisfy $\frac{1}{32}$, $\frac{1}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ of the full lime-absorbing capacity of the soil on the different plots at each location. Almost all the soils used were acid and deficient in P, while 75% of the soils were deficient in K. The only appreciable effect of increasing the rate of Ca treatment was to increase slightly the protein content of the grain and thus improve its baking quality over that from plots receiving no Ca. In no other respect did Ca treatment affect the chemical composition of the grain. No yield data are given, but it is stated that where no Ca was applied, yields were not appreciably below those where the full Ca treatment was applied.—P.J.B.

505 BRUEHL, G. W. **Temporary sterilization of soil in the evaluation of root and crown rot losses with wheat and barley under field conditions.** *Pl. Dis. Reptr* 1952, **36,** No. 6, 234-7, bibl. 4. [Pl. Path. Dep., S. Dakota State Coll., Brookings]

The results are reported of trials in S. Dakota during 1948-51 on the sterilization of soil each spring by injections of 3 ml. of chloropicrin per sq. ft. to a depth of 6 in. Crops of wheat and barley grown on treated soils were delayed in emergence and the early growth of seedlings was retarded, compared with crops grown on untreated plots. After a period of initial growth retardation, growth acceleration took place and at the jointing stage, plants on treated soil produced 2 or 3 times more dry weight than untreated controls. At the heading stage the treatment caused a weakening in growth and the final grain yields of treated plots were considerably below those of untreated controls. The period of growth acceleration caused by the treatment was considered to be due to a high level of available soil nutrients and to a relative absence of soil pathogens. The retardation of growth at a late stage was considered to be due to a rapid build-up of soil pathogens following dispersal of the chloropicrin. The effects of chloropicrin varied considerably from season to season, but it is thought that study of soil fungicidal treatments may lead to large grain yield increases.—P.J.B.

506 FIFIELD, C. C. and ROBERTSON, D. W. **Milling, baking and chemical properties of Marquis and Kanred wheat grown in Colorado and stored for 19 to 27 years.** *Agron. J.*

1952, **44,** No. 11, 555-9, bibl. 7. [Colorado Agric. Exp. Sta., Fort Collins]

Studies were made of the milling and baking qualities, chemical composition, thiamine content and germination of samples of Marquis and Kanred wheat stored for varying periods up to 27 years in a dry, unheated room. Seed samples of both varieties failed to germinate after 27 years storage, though samples of Marquis stored for 26 years had a germination of 19.5%. Samples stored for periods of less than 26 years had different germination percentages, the differences not being correlated with time of storage. Storage resulted in slight reductions in the amount of protein in the grain, though these reductions were not significant. The thiamine content of the grain did not change significantly with increasing periods of storage. Diastatic activity in the grain appeared to increase as the period of storage increased.—P.J.B.

BUCKWHEAT

507 DROZDOV, S. N. [**Pre-sowing steeping of seeds in copper sulphate solutions as a means of satisfying the copper requirement of the plants.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1952, **83,** No. 6, 929-30, bibl. 12. [Leningrad Agric. Inst.]

Seed of buckwheat (*Fagopyrum esculentum*) and maize (*Zea mays*), following steeping in solutions containing 80, 160 and 240 mg. of copper sulphate and subsequent drying, was sown on small trial plots with four replications. Data reported indicate that buckwheat and maize reacted favourably to such treatment.—R.P.J.

OATS

508 REITZ, L. P. **Oats in Nebraksa.** *Bull. 408 Univ. Neb. agric. Exp. Sta.* 1951, pp. 44, illus. [Received 1952]

An account is given of the development of oat growing in Nebraska over the period 1890—1950. The results of varietal trials at Lincoln and in central and western Nebraska are given, with a brief description of 60 varieties either tested, or grown commercially. Cultivation practices suitable for Nebraska conditions are reviewed.—P.J.B.

509† MICZYŃSKI, K. Owies szorstki (*Avena strigosa* Schreb.)—zanikająca roślina uprawna w powiecie nowotarskim. **The sand oat (*Avena strigosa* Schreb.), a disappearing crop plant in the Nowy Targ district [Poland].** *Acta Soc. Bot. Polon.* 1949-50, **20,** No. 1, 155-68, bibl. 27, illus., English summary 165-8.

The sand oat belongs to the ancient, primitive crop plants which were formerly more extensively cultivated, but are now dying out and being supplanted by other, more productive, crops. The centre of diversity of this species and the supposed centre of its origin lie in the Iberian peninsula and the main geographical areas of its culture are Spain, Portugal and the British Isles. In order to study in detail the botanical composition of the local cereal varieties grown in the Carpathian mountains, as well as to discover the actual places of the probable culture of *Avena strigosa*, the author and his collaborators undertook this agricultural/physiographic investigation of the Nowy Targ district.—From author's summary.

510 MURPHY, H. C. and ATKINS, R. E. **Clintafe oats.** *Iowa Fm Sci.* 1952, **7,** No. 5, 71-3, illus.

This variety was released in the autumn of 1952 in Iowa. It is a cross between Clinton and an Argentinian variety, Santa Fe. It is resistant to the crown rust races prevalent in the USA, including Race 45, and is tolerant of Septoria black-stem disease (*Leptosphaeria avenaria*). In yield trials over a 3-year period in Iowa, it has averaged 8 bu. per ac. more than Clinton and 2 bu. per ac. more than Shelby.—P.J.B.

511 THRONEBERRY, G. O. and SMITH, F. G. **The effect of triphenyltetrazolium chloride on oat embryo respiration.** *Science* 1953, **117,** No. 3027, 13-15, bibl. 20. [Bot. and Pl. Path. Dep., Iowa State Coll., Ames]

512 HUEBNER, R. Vierjährige Untersuchungen über Kornqualität und Leistungseigenschaften des Hafers. [**Four-year studies of grain quality and performance characters in oats.**] *Z. Acker- u. Pflbau* 1950, **93,** No. 1, 44-78, 1951, **93,** No. 2, 169-97, bibl. 13. [Inst. Acker- u. Pflbau, Univ. Göttingen]

513 KLINGMAN, G. C. **Wild garlic in Arlington oats controlled by competition plus the use of 2,4-D.** *Proc. 5th Southern Weed Conf., 1952* 1952, 132-4. [N. C. Agric. Exp. Sta., Raleigh]

Trials were carried out in a field near Raleigh, N. Carolina, in which 2,4-D combined with heavy manurial treatment was used to control garlic (*Allium sativum*), a weed which has been shown to be resistant to 2,4-D. The oats were sown in October following the application of 500 lb. per ac. of 2-12-12 (NPK) manure and were top-dressed with N during early spring to ensure rapid growth. By early March, the oats and garlic were 5-7 in. tall. On 8 March, applications of 1 and 1.5 lb. per ac. of 2,4-D triethanolamine salt were made. Complete control of garlic was obtained in the plots reated with 2,4-D. On untreated plots, the com- etition by the oats reduced, but did not eliminate, he garlic. There was no significant difference etween the 2,4-D-treated and untreated plots in espect of plant height, test weight of grain, or rain yield. The treatment with 1.5 lb. per ac. ,4-D significantly increased the protein content f the grain.—P.J.B.

14 TEDIN, O. and GELIN, O. E. V. Kombinerade sort- och mangangödslingsförsök i havre och potatis. [**Combined varietal and manganese trials in oats and potatoes.**] *K. LantbrAkad. Tidskr. Stockh.* 1952, **91**, No. 2-3, 158-78, bibl. 4, English summary pp. 177-8.

'he results are given of 6 trials with oats and 11 vith potatoes in Sweden, in which a number of arieties were sprayed with 1000 l. of 1% $MnSO_4$ olution twice per season. Two oat and 4 potato rials were carried out on thin, sandy soil at Jgerup and the rest in Skåne and on the Island of otland. In both oats and potatoes, evident, ut not significant, varietal differences could be oted in the response to Mn. Among potato arieties, there was no correlation between Mn- esponse and maturity. Among oat varieties, in ises where Mn-deficiency could be shown to reduce rain yields, Mn-deficiency symptoms were clearly vident. With potatoes, the symptoms of Mn- eficiency were most obvious in Parnassia and, to a ightly lesser extent, in Stärkereich I and Wohlt- ann. It was considered that Parnassia was the est among the varieties used for determining the istence of Mn-deficiency in soils for potato grow- ig. In certain cases, Mn-deficiency reduced otato yields without foliar symptoms being pparent. With oats, Mn supplements increased ain yields more than straw yields, though this fect was often complicated by other external ctors. With potatoes, Mn supplements appeared cause slight increases in starch content, but had effect on vitamin C content, or on the tendency flesh discoloration on cooking.—P.J.B.

5 COÏC, Y. Différence de sensibilité à la carence en manganése de variétés d'avoine. [**Difference in sensitivity to manganese deficiency in oat varieties.**] *C. R. Acad. Agric. Fr.* 1952, **38**, No. 5, 209-12.

nsitivity of oat varieties to manganese deficiency s assessed on a scale of 20. There are marked d surprising differences in sensitivity between rieties, possible reasons for which are advanced. D.B.

5 WILLIAMS, C. H. and MOORE, C. W. E. **The effect of stage of growth on the copper, zinc, manganese, and molybdenum contents of Algerian oats grown on thirteen soils.** *Aust. J. Agric. Res.* 1952, **3**, No. 4, 343-61, bibl. 14, illus. [CSIRO, Canberra, A.C.T.]

Algerian oat plants grown on 13 soils in a glasshouse were harvested at intervals throughout the growing period and, when large enough, were divided into leaves, stems, and (in later harvests) flowers or fruits. Copper, zinc, manganese, and molybdenum were determined on the separate plant fractions. Characteristic changes in the trace-metal contents of the plant with growth were found for each element. These changes were generally similar, irrespective of the soil on which the plants were grown. With the exception of manganese, the availability of the element in the soil did not affect the trend of the changes as the plant matured, but only the amount present. The uptake of each of the four elements continued through the whole period of growth. The total amounts of copper and zinc in both the leaf and the stem decreased after flowering as translocation to the grain proceeded. The amount of manganese in the leaf increased throughout the period of growth, although the rate of increase was less after flowering. The amount of molybdenum in the leaf increased until flowering, after which there was little further change. The rate of uptake of manganese was approximately equal to the rate of production of dry matter, whereas that of molybdenum, copper, and zinc was relatively greater in the early stages of growth. There was no observable influence of soil pH on the availability of copper and zinc, but that of manganese decreased with increasing pH. The availability of molybdenum was affected by the combined influences of soil pH and soil iron.—From authors' summary.

517 SKAZKIN, F. D. and LERMAN, R. I. [**Effect of a deficiency of soil water on vernalized and non-vernalized cereals in different periods of their development.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci., USSR*) 1952, **84**, No. 3, 627-30, bibl. 10, illus.

A deficiency of water supply affects spring cereals differently, depending on their developmental phase at the time of drought. At the vernalization phase they are less sensitive to lack of water but in the light phase (when reproductive organs, are being initiated) the drought resistance of the plant is lowered. This study of the effect of soil water deficiency (20% of the moisture capacity of the soil) in vernalized (temperature not given) and unvernalized plants at all stages of their development was undertaken with the two oat varieties Golden Rain (susceptible to drought) and Vizantiĭsk (drought-resistant). The results are reported for Golden Rain only, as the data were similar in both cases. A sample of the grain from each variety was vernalized and a second sample left unvernalized. Both samples were sown in cultures on 14 May and 29 June. In these two series the following variants were studied : (a) control, plants grown with optimal water (60% of the soil's water capacity) during all phases of vegetation ; (b) plants grown with deficient water supply (20% of soil's water capacity) in the first phase of development, i.e., from seedling emergence to the appearance of spikelet primordia ; (c) deficient water supply at the second period, i.e. from the appearance of spikelet primordia to the end of the light phase (tetrad formation in sporogenesis) ; (d) deficient water at the third period (beginning of tetrad formation to full earing). Tabulated data are included showing number of spikelets per spike in the main stem under the above 4 variants and also number of grains per plant and grain yield (g. per plant) under the 4 variants. There is evidence that vernalized plants under optimal water supply give the best yields ; at the critical period (3rd in these tests) vernalized plants are more resistant than non-vernalized to deficient moisture.—M.H.

518 Nawrocki, Z. Studia biometryczno-hodowland and Cz. II. Zawartość luski w ziarnie owsa w świetle współza-leżności z niektórymi innymi jego mierzalnymi cechami. [**The percentage of hull in oat grain and its relation to other characters of the grain.**] *Ann. Univ. M. Curie-Skłodowska* Sect. E, 1951, **6,** No. 14, 383-427, bibl. 31, illus. Russian and English summaries pp. 424-7. [Received 1952]

The purpose of this paper is to elaborate the question of glume content in oat grains from two aspects, i.e. (1) to estimate the constant numerical characteristics for per cent glumes in grain of the main varieties of Polish oats ; (2) to simplify the usual laboratory method of determining the glume percentage in oats by using its dependence on 1000-kernel weight, and weight of hectolitre volume.—From author's summary.

519† Ready, D. and others. **Albinism induced [in oats] by substituted benzoic acids.** *Pl. Physiol.* 1952, 27, No. 1, 210-11, illus. [Chem. Corp., Camp Detrick, Md]

520 Bobrov, Ruth A. **The effect of smog on the anatomy of oat leaves.** *Phytopathology* 1952, **42,** No. 10, 558-63, bibl. 13, illus. [Bot. Dep., Univ. Calif., Los Angeles]

Studies are reported on anatomical changes in oat leaves, mainly in the stomatal areas, caused by smog [smoke + fog] in the Los Angeles district of California. Smog causes severe damage to oat crops in this region.—P.J.B.

521 Behrens, W. U. Der Einfluss der Phosphorsäure auf den Stoffumsatz junger Haferpflanzen. II. [**The influence of phosphoric acid on the metabolism of young oat plants.**] *PflErnähr. Dung.* 1952, **56,** No. 1-3, 80-90, bibl. 2. [Landw. Versuchssta. Kali-Chemie A.-G. Hannover, Germany]

Pot experiments with oat plants were conducted to determine the modifying effect of nitrogen on the action of phosphorus in the plant. There were sixteen combinations of N and P, nitrogen being applied at 0.2, 0.6, 1.0 and 1.4 g. N per pot and phosphorus at 0.0, 0.15, 0.4, and 1.0 g. P_2O_5 per pot. When richly supplied with N, P_2O_5 lowered the plant content of sugar, and raised the content of nitrogen, protein and chlorophyll. In the presence of poor supplies of N, P_2O_5 had the opposite effect. The amounts of nitrate and of non-protein nitrogen in the plant were increased by low supplies of P_2O_5 but decreased by plentiful supplies. —D.B.

522 Larson, W. L. and others. **The effects of phosphate fertilization upon the yield and composition of oats and alfalfa grown on phosphate-deficient Iowa soils.** *Agron. J.* 1952, **44,** No. 7, 357-61, bibl. 6, illus. [Exp. Sta. Ames, Iowa]

In 1946, plots of phosphorus-deficient soils were uniformly treated with N and K and supplied with superphosphate at the rates of 0, 30, 60, 120 and 240 lb. P_2O_5 per acre. An oat crop undersown with lucerne was grown in 1946 and hay crops of lucerne were taken in 1947-8-9. Curves for each year showing the response of yields of oats and alfalfa to successive increments of P_2O_5 demonstrate that the first increment of 30 lb. gave the greatest response in yield for the first 3 years. By 1949 the first increment was ineffective and the 60 lb. application of P was giving the greatest response. The P content of oat grain varied from 0.29% on no-phosphate plots to 0.44% on heavily phosphated plots. The P content of the oat straw also reflected the quantity of P applied to the soil. After 1947 there was a steady decrease in the P content of lucerne, except in plots manured at the rate of 240 lb. P_2O_5 per ac. Only plots manured at the highest rate showed any increase in available soil phosphate.—W.J.B.

RYE

523 Denmark. Statens Forsøgsvirksomhed i Plantekultur. Forsøg med rugsorter 1946-51. [**Varietal trials with rye, 1946-51.**] *Tidsskr. Planteavl* 1952, **56,** No. 1, 151-4.

The results are given of trials at 10 locations in Denmark during 1946-51 with the following rye varieties : Borris Perle, Petkus, Svaløf Stål, Trifolium, Svaløf Kongsrug, Maria, Haastrup, Øtofte Elite I and Petkus Zuchtgartengemisch. Three groups of trials were carried out, one on clay soils and good sandy soils, the second on light, sandy soils and the third on peat soils. In the first group of 32 trials, Borris Perle gave the highest average grain yields, with 42.2 hkg. per ha., followed by Petkus, 40.2, Svaløf Stål, 40.5, and Trifolium, 40.4 hkg. per ha. In the second group of 18 trials, Borris Perle gave the highest grain yields, with 27.6 hkg. per ha., followed by Trifolium and Svaløf Kongsrug, both with 26.5 hkg. per ha. In 6 trials during 1950-1, Petkus Zuchtgartengemisch gave average grain yields of 28.1 hkg. per ha. On peat soils, Borris Perle again gave the highest yields in 5 trials, with 21.2 hkg. per ha., followed by Petkus, 19.6, and Svaløf Stål, 19.5 hkg. per ha. Data are given of straw yields and there are brief notes on each variety.—P.J.B.

524 STRAND, E. Resultater av sortforsøk med høstrug på sør-Østlandet for årene 1937-38 til 1949-50. [**Results of varietal trials with winter rye in south-eastern Norway during the years 1937-38 to 1949-50.**] *Forsk. Fors. Landbr.* 1952, **3,** No. 1, 49-67, bibl. 20, English summary pp. 65-6. [Norges LandbrHogsk. Aas, Norway]

A report is given of the results of 13 trials at Aas and 31 trials at farms in south-eastern Norway, with 13 varieties of winter rye. The most common soil-type was a medium-heavy clay and the ground was usually frozen and snow-covered from early December to late March. The mean grain yield from all trials of the adapted, local variety Refsum, used as a standard, was 227 kg. per decare. Kongsrug II and Kirsch both significantly outyielded Refsum, giving yields 27 and 25 kg. per decare higher than Refsum, respectively. Six other varieties also outyielded Refsum; they were: Malmrug, Vasa II, Petkus, Stålrug, Sangaste and Grårug; Malmrug being the highest yielding of this group with 11 kg. per decare higher yield than Refsum. In straw yields, the highest yielding varieties were Sangaste, Petkus, Grårug and Refsum, with 528, 520, 510 and 508 kg. per decare respectively. In studies of the effect of rainfall and temperature during different growth stages, it was apparent that temperature and rainfall above the average before heading and temperature and rainfall below the average between heading and grain maturation were conducive to high grain yields in winter rye.—P.J.B.

BARLEY

525 ULONSKA, E. Einfluss von Saatzeit und Saatstärke auf den Ertrag des Wintergetreides. [**Influence of sowing date and rate of sowing on the yield of winter cereals.**] *Mitt. dtsch. Landw.-Gesellsch.* 1952, **67,** No. 38, 667-8. [Landessaatzuchtanstalt Weihenstephan, Germany]

The information in this article is based on results of experiments carried out in Bavaria. Winter barley: the optimal sowing date is from 15 to 25 September. When sown in early October, mid-October or mid-November yields fall by 14, 25 and 50%, respectively. The customary rate of sowing is 120 to 170 kg./ha. but the best yields are obtained at 130 to 150 kg./ha. with rows not less than 16 cm. apart. Winter rye: the best sowing date for average conditions in Bavaria is 25 September. Later sowing results in lower yields. With earlier sowing the crop runs the risk of attack by insect pests. The rate of sowing varies with locality; for normal conditions it was 130 to 140 kg./ha. Rows about 15 cm. apart gave excellent spacing of plants. Winter wheat: the sowing date for winter wheat is more elastic than for winter barley or winter rye. The optimal date is 10 October. If sown at a later date the germination period is longer and the plants are weaker and less fit for overwintering. The rate of sowing has varied considerably, 80, 120, 160 and 230 kg./ha. being quoted. A high seeding rate can be remedied, but not a low one. However, 200 kg./ha. is considered too high.—D.B.

526 PFEIFFER, Hildegard. Saatzeitversuche mit Winter- und Sommergerste. [**Experiments in sowing winter and summer barley at different times.**] *Z. Acker- u. Pflbau* 1949, **91,** No. 2, 135-49, bibl. 16. [Received 1952] [Inst. Pflbau, Univ. Göttingen, Germany]

Three years' trials were made with 6 varieties of winter barley and 4 of summer barley. The winter barley was sown in the middle of September and thereafter at 4 intervals of 10 to 14 days before the turn of the year and at 5 more intervals of 10 to 14 days in the spring, ending at the beginning of May. Seed used for the last sowing was vernalized. The spring barley was sown at 5 intervals of 10 to 14 days, ending at the beginning of May. The following are among the conclusions reached. Tillering is a varietal character; in winter barley it was always greatest in the earliest sowing, but in summer barley the time of sowing had little effect on it. The period of vegetative development from seedling emergence to shooting of the ear becomes shorter with each later sowing and is a varietal character; the period of generative development, from flowering to maturity, on the other hand, is hardly affected. There is no correlation between tillering and number of ears. The percentage earing varies according to variety. In winter barley, haulm length diminishes as sowing date is postponed and the growing season is shortened. Thousand-grain weight depends on density of stand and length of the generative phase; it increases, the later the time of sowing. The number of grains per ear is highest in the earliest sowing. The yield of single ears falls as sowing is delayed, but in any case is subject to great annual fluctuation. In both winter and summer barley, the highest grain and straw yields are obtained from the earliest sowing. The amount of the reduction in yield produced by postponement of sowing varies according to variety. The percentage protein content in the grain increases with the lateness of sowing. The protein yield per unit area, however, is fairly independent of time of sowing in winter barley, the yield of crude protein remains constant at about 3.5 dz. per ha. following both early and late sowing dates. The summer barleys exhibit certain slight differences as between fodder and malting barleys.—G.M.R.

527 Ayers, A. D. and others. **Salt tolerance of barley and wheat in soil plots receiving several salinization regimes.** *Agron. J.* 1952, **44,** No. 6, 307-10, bibl. 9. [U.S. Salinity Lab., Riverside, Calif.]

Studies were made of the salt tolerance of Hank, Chevron, Atlas and California Mariout barley and Lemhi and Ramona 44 wheat, grown at Riverside, California, and subjected to different salinity treatments at different growth stages. The grain yield of California Mariout barley following the application of 20,000 ppm. salt in the irrigation water after the 4-leaf growth-stage had been reached, was 83% of that of controls given salt-free water. Where 10,000 ppm. of salt was applied at the time of sowing and up to the 4-leaf stage, followed thereafter by 20,000 ppm. salt, yields were only 21% of those of the controls. California Mariout and Hank were the most salt-tolerant of all the varieties used. Where the salt concentration was 10,000 ppm. up to the 4-leaf stage and was raised thereafter to 20,000 ppm., 87% of the Lemhi wheat plants were killed, compared with 3% for California Mariout, 34% for Atlas barley, 60% for Ramona 44 wheat and 73% for Chevron barley. Hank was almost as resistant as California Mariout. Where no salt was applied in the irrigation water prior to the 4-leaf stage, the salt concentration being subsequently raised to 20,000 ppm., few plants of any variety died. The effect of salt on all plants was to inhibit their growth, but to inhibit their grain yields to a much smaller extent. Wide variations in the salt concentration of irrigation water applied after the boot stage had little effect on plant growth, grain yield, or time of maturity.—P.J.B.

528 Dickson, T. B. and Meiklejohn, A. K. M. **Barley varieties. 1. In mid-Scotland. 2. In the Lothians and Borders.** *Scot. Agric.* 1952, **32,** No. 2, 96-9. [Edinb. and E. Scot. Coll. Agric.]

529 Cambridge. National Institute of Agricultural Botany. **Proctor spring malting barley.** 1952, pp. 4.

Proctor barley, bred by Dr. Bell of Cambridge, is a hybrid selected from a cross between Kenia and Plumage-Archer. It has a short neck and an ear which is longer and denser than Kenia, but laxer and quite distinct from Plumage-Archer. Its straw is shorter and stronger than Spratt-Archer or Plumage-Archer. In 3 years' NIAB trials, Proctor significantly outyielded Kenia in 28 out of 37 trials by 15%, on the average. The results of malting analyses show that Proctor usually produces grain of better quality than Kenia, with a lower nitrogen content, a higher extract and better appearance. Proctor is suitable for spring sowing in the main malting-barley areas where extreme earliness is not a major consideration.—C.L.S.

530 Vovčenko, I. V. [**Winter barley in Odessa Province.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 7, 79.

Winter barley was grown in Odessa Province for many years prior to the Great War and gave yields twice as large as those of spring barley. The varieties sown were, however, not sufficiently winterhardy. A new variety of winter barley, Pallidum 17, bred at the All-Union Institute of Genetics, has proved sufficiently winterhardy. In the cold winter of 1949/50 with 26 [centigrade] degrees of frost and a snow cover of only 1 or 2 cm., this variety, although thinned out slightly, made rapid growth in the spring and gave a grain yield of 16 ctr./ha., whereas the other varieties under test died out completely.—R.P.J.

531 Denmark. Statens Forsøgsvirksomhed i Plantekultur. Medd. 467. Forsøg med bygsorter 1945-1950. [**Varietal trials with barley, 1945-50.**] *Tidsskr. Planteavl* 1952, **55,** 550-3.

The results are given of trials at 10 locations in Denmark with 9 barley varieties. In 6-years' trials, Svalöf's Ymer gave the highest average grain yield, with 44.1 hkg. of grain per ha., followed by Abed Maja, 43.8 hkg. and Alfa, 42.2 hkg. per ha. In 4-years' trials, Carlsberg and Pajbjerg Drot gave 44.2 and 43.8 hkg. per ha., respectively. In 2-years' trials, Plougstrup 544, Svaløf's Heimdal, Weibull's Herta and Øtofte Fero yielded 43.7, 43.3, 42.5 and 41.7 hkg. of grain per ha. respectively. Brief notes are given on each variety.—P.J.B.

532 Mansfeld, R. Das morphologische System der Saatgerste, *Hordeum vulgare* L.s.l. [**The morphological classification of grain barley, *Hordeum vulgare* L.s.l.**] *Züchter* 1950, **20,** No. 1/2, 8-24, bibl. 19. [Received 1952] [Dtsch. Akad. Wissenschaft., Berlin, Gatersleben, Krs. Quedlinburg, Germany]

After a brief literature review of the systematics of *Hordeum vulgare*, a key is given for the identification of varieties within each of the co-varieties *hexastichon*, *intermedium*, *distichon*, and *deficiens.*

There are also (a) a tabular summary of the distri-ution of the characters of the spike throughout the arieties of the species and (b) a list of 192 syn-nyms together with the geographical distribution f varieties.—D.B.

33† Covas, G. Nota taxonómica sobre especies Sudamericanas de " Hordeum." [**Taxonomic notes on species of *Hordeum* in South America.**] *Rev. Argent. Agron.* 1952, **19,** No. 3, 140-2.

Notes are given on the following species: *H. ndinum, H. besteroanum, H. chilense, H. coleo-horum, H. flexuosum, H. pubiflorum, H. stro-elense, H. utriculatum,* and *H. valdiviae.*—W.J.B.

34 Denmark. Statens Forsøgsvirksomhed i Plantekultur. Medd. No. 482. Sønderdeling af hormonpraeparater (2,4-D og 4K - 2M) i jordbunden. [**Breakdown of hormone herbicides (2,4-D and 4K-2M) in the soil.**] *Tidsskr. Planteavl* 1952, **56,** No. 1, 173-4.

n trials with barley and vetches, it was apparent hat repeated applications of 2,4-D and 4K - 2M to oils did not have a cumulative herbicidal effect on he plants, but that as the number of times the erbicides were applied to the soil increased, the horter the time their growth-inhibiting effect on he test plants lasted. From the soils used in hese trials, 2 pure cultures of bacteria were ob-ained which were able to utilize 2,4-D Na salt and ne of which could utilize 4K-2M in artificial ubstrates. The addition of pure cultures of these acteria to soils caused applications of 250 kg. of ctive 2,4-D and 4K-2M to disappear from the oil within 2 to 3 weeks. The addition of easily-ecomposable organic matter to the soil also ppeared to speed up the breakdown of 2,4-D in he soil.—P.J.B.

35 Tessi, J. L. " *Xanthomonas translucens* f. s. *hordei*" en la Argentina y determinacion de variedades de cebada resistentes. [***X. translucens* f. sp. *hordei* in Argentina and studies of resistant varieties of barley.**] *Rev. Invest. Agric., B. Aires* 1951, **5,** No. 3, 353-73, bibl. 21, illus.

o variety of barley was found immune to *X. ranslucens.* The most resistant were: Wisconsin Winter × Glabion 2073, Brugh 23.C.I. 6491, indred 6969, Maja, Black Russian C. I. 2202 and ork Hooded. [See *Fld Crop Abs.* 4 : 49.]—W.J.B.

36 Folkes, B. F. and others. **The respiration of barley plants. 7. The metabolism of nitrogen and respiration in seedlings.** *New Phytol.* 1952, **51,** No. 3, 317-41, bibl. 25, illus. [Dep. Bot., Univ. Bristol]

he respiration of barley seedlings has been studied nder conditions in which active assimilation of itrogen and synthesis of protein occur. An account is given of the cultural and other experimental methods which were developed for these investigations. When the seedlings were grown in the absence of external supplies of nitrogen it was found that high respiratory rates coincided with the transfer of reserve nitrogenous materials from the endosperm to the embryo. Exhaustion of these reserves could be related to a decline in respiration. The provision of external supplies of nitrogen to the seedling led to an increase in respiratory rate and there is evidence that the initial acceleration is attributable chiefly to a primary effect on the root system. The respiration of detached roots is markedly increased by treatment with dilute solutions of ammonium salts and nitrates. The respiration of some of the chief parts of the seedling during germination is described. The endosperm is responsible for only a small but relatively steady proportion of the total respiration during the early stages of germination. Considerable changes in respiration rate of both leaf blade and root were observed during development; the contrast in respiratory behaviour of these two organs may be related to their differences in growth and differentiation. A close but complex relation appears to exist between respiration and the content of tissue protein in the embryo. High respiratory rates are associated with both the assimilation of endospermic reserves and external sources of nitrogen and it is suggested that the rate of carbohydrate metabolism is adjusted in relation to synthetic activities in the seedling.—Authors' summary.

537 Andersen, S. **Methods for determining stages of development in barley and oats.** *Physiol. Plant.* 1952, **5,** No. 2, 199-210, bibl. 12, illus. [Pl. Cult. Dep., Roy. Vet. Agric. Coll., Copenhagen.]

Studies were carried out in 1949, '50 and '51, in Denmark, to determine the course of development of the reproductive parts of oat and barley plants. The first study of the developing ear of barley plants was made when the plants had an average of 1.5 leaves and the last study when the plants averaged between 4 and 4.5 leaves. In the case of oats, the respective leaf numbers were 2.5 and 5.5. In determining the leaf numbers, only the main shoots were used and no new leaf was counted until its length in cm. was equal to half its number in the scale, i.e., the 3rd leaf was not counted until its tip was 1.5 cm. from the ligule of the first, or second, leaf. In the case of barley plants, 13 development stages of the growing point from when it was still in the kernel, up to anthesis, were distinguished. In oats, 10 development stages were distinguished. A partial correlation was found between stage of ear development and the number of leaves. The ear did not start growth at a given leaf-number stage in all the varieties studied and in all the years. It was concluded that where a high degree of accuracy was not required, leaf numbers constitute an effective index of growth stage, where the plants have less than 6 leaves; after the 6-leaf stage, Feekes' method is regarded as suitable. [See also *Fld Crop Abstr.* 3:1204 and Abs. 539.]—P.J.B.

538 DERSCHEID, L. A. **Physiological and morphological responses of barley to 2,4-dichlorophenoxyacetic acid.** *Pl. Physiol.* 1952, **27,** No. 1, 121-34, bibl. 13, illus. [S. Dakota State Coll., Brookings]

539 ANDERSEN, S. **Sensitivity to 2,4-D of barley and oats at different stages of development.** *Physiol. Plant.* 1952, **5,** No. 3, 321-33, bibl. 13, illus. [Pl. Cult. Dep., Roy. Vet. Agric. Coll., Copenhagen]

In field trials in Denmark during 1949, '50 and '51, 4 varieties of barley and 4 of oats were sprayed with 1 kg. of 2,4-D Na salt per ha. In barley, the highest number of tubular leaf abnormalities were caused by sprays applied when the growing point had between 1 and 2 leaf primordia. The highest number of abnormal kernels followed treatment when the growing point had 2 - 3 leaf primordia, or about 6 days before the spikelet primordia were visible and at what was considered to be the stage of transformation from the vegetative to the reproductive growth phase in the growing spikelet. The greatest reductions in grain yields were associated with high numbers of tubular leaf abnormalities. In terms of leaf numbers [see Abs. 537], spraying when the leaf number was about 2 resulted in the highest number of abnormal kernels and tubular leaves. The stage at which barley was susceptible to 2,4-D was considered to end when the growing point had 4, or more, leaf primordia, at which stage the leaf number was under 3.5. In 1949, frost occurred just before and just after the 2,4-D treatment. The effect of frost appeared to be an increase in the activity of the 2,4-D in causing abnormalities and many abnormal kernels were caused by sprays applied following frost, when the growing point leaf primordia were in process of transformation into the primordia of the central spikelets. In the case of oats, maximum susceptibility to 2,4-D damage occurred between the stages at which the branch intials of the second order were being formed and when the top spikelet was covered by empty glumes, corresponding to leaf numbers of 4 and 6, respectively. The lowest grain yields in oats corresponded to the highest numbers of the non-split lemma abnormality. In barley, more 2,4-D abnormalities occurred in Maja than in Rigel, Freja and Alfa, though yield differences between the varieties were not significant. In the oat varieties, Minor appeared to be more susceptible to 2,4-D damage than Rex, Opus, or Stål, but differences were small.—P.J.B.

540 NICHOLAS, D. J. D. **The potassium status of barley in relation to yields of grain.** *J. agric. Sci.* 1952, **42,** No. 4, 468-75, bibl. 39. [Univ. Bristol, Res. Sta., Long Ashton]

Various portions of barley plants were made available for chemical tests from manurial experiments designed to test the effects of K treatment (broadcast and placed with the seed) on grain yield. The experiments, which were located at 3 centres differing in soil characters and K status, confirmed that the minimum K levels required for maximum yields were higher than those associated with the onset of visual symptoms of K deficiency. Crop plants may therefore have sub-optimal levels of nutrients without exhibiting external symptoms. Only chemical methods can determine such values, and quick chemical procedures are of use in this respect. Determination of minimum levels in relation to yields would be of special use for micronutrient deficiencies. Further work is required to study the chemical status of crops in relation to yields in long-term manurial experiments of factorial design located at numerous centres incorporating various types of soil, fertility levels and climatic conditions. —K.L.

541 BAKER, G. A and others. **A uniformity trial on unirrigated barley of ten years' duration.** *Agron. J.* 1952, **44,** No. 5, 267-70, bibl. 2, illus. [Calif. Agric. Exp. Sta.]

Results are given of statistical studies made on grain yields from 57 one-tenth acre plots on which barley was grown continuously for 10 years.—W.J.B.

MAIZE

542† RATTRAY, A. G. H. and ELLIS, B. S. **Maize and green manuring in Southern Rhodesia.** *Rhod. agric. J.* 1952, **49,** No. 4, 188-97, bibl. 4.

This article reviews the problem of green manuring in Southern Rhodesia in the light of theoretical considerations, against the background of the information available, and of results obtained from the Salisbury Agricultural Experiment Station. Fourteen rotations were tested, incorporating with the rotation a legume turned in as green manure, a legume reaped for hay, and a grass (*Panicum makarikari* [= *P. coloratum* var. *makarikariensis*], all followed by varying numbers of maize crops. The results illustrate the superiority of green manuring, in alternate years, over all the other systems tested. They show the lack of persistence of the effect beyond the first year following the green crop and they indicate that the incorporation of the bulky, nitrogen-rich, easily and beneficially decomposable organic matter of the green crop is a vital factor in green manuring. Although under the conditions of the experiment, 4 years under *P. makarikari* was not enough to affect soil structure, it is possible (in the light of results from other experiments) that any improvement in soil structure caused by the grass was more than offset by the impoverishment of the soil in nitrogen when the grass was ploughed in. An intensive investigation is planned to ascertain more exactly, from yields and from detailed chemical analyses of crops, what exactly is responsible for the beneficial effects of green manuring.—K.L.

543 van Doornik, A. W. Ervaringen met de teelt van voorgewas en ondervrucht van mais op de zandgronden in het Rijk van Nijmegen. [**Experiences with catch crops preceding and sown under maize on the sandy soils of the Rijk of Nijmegen.**] *Maandbl. LandbVoorlDienst* 1952, **9**, No. 8, 302-3.

Since maize ripens late in the Netherlands it is not possible to grow a catch crop immediately after the harvest, as is done with other cereals. In order to overcome this objection it is suggested that : (1) an August-sown catch crop of Westernwolths ryegrass should be grown immediately before maize, (2) the maize should be undersown with serradella. Both suggestions were carried out in the Rijk of Nijmegen with success. The ryegrass was sown in August after potatoes or rye at the rate of 60 kg. per ha. and an autumn cut of grass for silage was taken. A dressing of 400 kg. per ha. of N was applied in February and the grass was cut again for silage towards the end of April. The ryegrass stubble was then ploughed under in preparation for a maize crop. Serradella was sown, under the maize, at the rate of 30 - 46 kg. per ha. and after the maize harvest was strip-grazed.—W.J.B.

544 Aguzzi, G. Ricerche su la densità e la disposizione delle piante, in varietà e ibridi di mais, coltivati in asciutto e in irriguo, nella pianura emiliana. [**Investigations on plant density and spacing of maize hybrids and varieties grown with or without irrigation in the Emilia Plain (Italy).**] *Ann. Sper. agr.* 1952, **6**, No. 5, 1329-50, bibl. 13, English summary p. 1349. [Ist. Agron. Gen., Univ. Bologna, Italy]

The trials described were carried out in 1950-1 on clayey, fertile soil at Corticella, near Bologna, where maize is grown both with and without irrigation, to compare certain maize hybrids grown at different plant densities and spacings with local varieties. The results showed that the best plant densities without irrigation were : (a) Wisconsin 255 and Macario, early, 6 to 6.5 plants per sq. m. ; (b) Wisconsin 464, Nostrano dell'Isola and Ohio M. 15, medium-early, 4.5 to 5 plants per sq. m. ; and, under irrigation: (a) Wisconsin 255, early, 7.5 plants per sq. m.; (b) Ohio M. 15, U. 32, Pioneer 340, Scagliolo 23 A, medium-early and medium late, to 5.5 plants per sq. m. ; (c) U.S. 13, late, 4 plants per sq. m. ; (d) Scagliolo Gigante, very late, 3.5 plants per sq. m. The hybrids required the same plant densities as the local varieties. The plants grown in square clumps yielded slightly more, and matured earlier, than did the plants grown in rows. As the plant density increased there was an increase in the number of sterile plants, in the attacks by corn-borer and smut, and in the height of ear insertion. Irrigation raised the grain yields, especially of the late types and at the higher plant densities. —E.B.O.

545 Hofmeyr, J. D. J. **The origin and history of maize.** *Fmg in S. Afr.* 1952, **27**, No. 319, 451-2. [Agric. Res. Inst., Pretoria]

546 Farm and Home Research. **New hybrid corn shows promise of reducing bird damage.** *Fm Home Res.* 1952, **37**, No. 279, 87 and 96, illus.

A note is given on work in Ohio on the development of early-maturing maize hybrids with a thick, heavy husk, giving protection against damage to the crop by birds. It is thought that bird-resistant hybrid varieties may be produced within 3-4 years. —P.J.B.

547 Rousseau, M. La culture du maïs-grain. Les résultats obtenus en 1951. [**Maize breeding. Results of trials in 1951.**] *Rev. Agric., Brux.* 1952, **5**, No. 3, 235-9.

Trials were carried out at Melle and Lokeren (Belgium) in 1951 to compare American and Dutch maize hybrids and local open-pollinated varieties. The varieties C.I.V.2 and C.I.V.7 gave the highest yields. From these trials and from observations in the Netherlands and the North of France the following varieties, now on the market, are provisionally recommended : Wisconsin 240, Nodak 301, Wisconsin 255 and Goudster.—K.L.

548 Naldi, L. Due nuovi ibridi di mais : Insubria 133, Insubria 524. [**Two new maize hybrids : Insubria 133 and Insubria 524.**] *Ital. agric.* 1952, **89**, No. 8, 550-3, bibl. 2, illus. [Sta. Sper. Maiscolt., Bergamo, Italy]

A description is given of Insubria 133 and Insubria 524 both bred at the above Station, the former being the Italian equivalent of Wisconsin 641 AA and the latter of Wisconsin 355. Their characteristics are described.—E.B.O.

549 Andres, J. M. Heterosis en maíces dentados y córneos. [**Heterosis in dent and flint types of maize.**] *Idia* 1952, No. 54, 16. [Agric. Vet. Fac., Buenos Aires]

Trials were carried out from 1943-5 and from 1948-9, in which a comparison was made between the yields obtained from three types of hybrids : dent × dent, flint × flint and flint × dent. On high degree of accuracy was not required, leaf numbers constitute an effective index of growth stage, where the plants have less than 6 leaves; after the 6-leaf stage, Feekes' method is regarded as suitable. [See also *Fld Crop Abstr.* 3:1204 and Abs. 539.]—P.J.B.

538 DERSCHEID, L. A. **Physiological and morphological responses of barley to 2,4-dichlorophenoxyacetic acid.** *Pl. Physiol.* 1952, **27,** No. 1, 121-34, bibl. 13, illus. [S. Dakota State Coll., Brookings]

539 ANDERSEN, S. **Sensitivity to 2,4-D of barley and oats at different stages of development.** *Physiol. Plant.* 1952, **5,** No. 3, 321-33, bibl. 13, illus. [Pl. Cult. Dep., Roy. Vet. Agric. Coll., Copenhagen]

In field trials in Denmark during 1949, '50 and '51, 4 varieties of barley and 4 of oats were sprayed with 1 kg. of 2,4-D Na salt per ha. In barley, the highest number of tubular leaf abnormalities were caused by sprays applied when the growing point had between 1 and 2 leaf primordia. The highest number of abnormal kernels followed treatment when the growing point had 2 - 3 leaf primordia, or about 6 days before the spikelet primordia were visible and at what was considered to be the stage of transformation from the vegetative to the reproductive growth phase in the growing spikelet. The greatest reductions in grain yields were associated with high numbers of tubular leaf abnormalities. In terms of leaf numbers [see Abs. 537], spraying when the leaf number was about 2 resulted in the highest number of abnormal kernels and tubular leaves. The stage at which barley was susceptible to 2,4-D was considered to end when the growing point had 4, or more, leaf primordia, at which stage the leaf number was under 3.5. In 1949, frost occurred just before and just after the 2,4-D treatment. The effect of frost appeared to be an increase in the activity of the 2,4-D in causing abnormalities and many abnormal kernels were caused by sprays applied following frost, when the growing point leaf primordia were in process of transformation into the primordia of the central spikelets. In the case of oats, maximum susceptibility to 2,4-D damage occurred between the stages at which the branch intials of the second order were being formed and when the top spikelet was covered by empty glumes, corresponding to leaf numbers of 4 and 6, respectively. The lowest grain yields in oats corresponded to the highest numbers of the non-split lemma abnormality. In barley, more 2,4-D abnormalities occurred in Maja than in Rigel, Freja and Alfa, though yield differences between the varieties were not significant. In the oat varieties, Minor appeared to be more susceptible to 2,4-D damage than Rex, Opus, or Stål, but differences were small.—P.J.B.

540 NICHOLAS, D. J. D. **The potassium status of barley in relation to yields of grain.** *J. agric. Sci.* 1952, **42,** No. 4, 468-75, bibl. 39. [Univ. Bristol, Res. Sta., Long Ashton]

Various portions of barley plants were made available for chemical tests from manurial experiments designed to test the effects of K treatment (broadcast and placed with the seed) on grain yield. The experiments, which were located at 3 centres differing in soil characters and K status, confirmed that the minimum K levels required for maximum yields were higher than those associated with the onset of visual symptoms of K deficiency. Crop plants may therefore have sub-optimal levels of nutrients without exhibiting external symptoms. Only chemical methods can determine such values, and quick chemical procedures are of use in this respect. Determination of minimum levels in relation to yields would be of special use for micronutrient deficiencies. Further work is required to study the chemical status of crops in relation to yields in long-term manurial experiments of factorial design located at numerous centres incorporating various types of soil, fertility levels and climatic conditions. —K.L.

541 BAKER, G. A and others. **A uniformity trial on unirrigated barley of ten years' duration.** *Agron. J.* 1952, **44,** No. 5, 267-70, bibl. 2, illus. [Calif. Agric. Exp. Sta.]

Results are given of statistical studies made on grain yields from 57 one-tenth acre plots on which barley was grown continuously for 10 years.—W.J.B.

MAIZE

542† RATTRAY, A. G. H. and ELLIS, B. S. **Maize and green manuring in Southern Rhodesia.** *Rhod. agric. J.* 1952, **49,** No. 4, 188-97, bibl. 4.

This article reviews the problem of green manuring in Southern Rhodesia in the light of theoretical considerations, against the background of the information available, and of results obtained from the Salisbury Agricultural Experiment Station. Fourteen rotations were tested, incorporating with the rotation a legume turned in as green manure, a legume reaped for hay, and a grass (*Panicum makarikari* [= *P. coloratum* var. *makarikariensis*], all followed by varying numbers of maize crops. The results illustrate the superiority of green manuring, in alternate years, over all the other systems tested. They show the lack of persistence of the effect beyond the first year following the green crop and they indicate that the incorporation of the bulky, nitrogen-rich, easily and beneficially decomposable organic matter of the green crop is a vital factor in green manuring. Although under the conditions of the experiment, 4 years under *P. makarikari* was not enough to affect soil structure, it is possible (in the light of results from other experiments) that any improvement in soil structure caused by the grass was more than offset by the impoverishment of the soil in nitrogen when the grass was ploughed in. An intensive investigation is planned to ascertain more exactly, from yields and from detailed chemical analyses of crops, what exactly is responsible for the beneficial effects of green manuring.—K.L.

543 VAN DOORNIK, A. W. Ervaringen met de teelt van voorgewas en ondervrucht van mais op de zandgronden in het Rijk van Nijmegen. [**Experiences with catch crops preceding and sown under maize on the sandy soils of the Rijk of Nijmegen.**] *Maandbl. LandbVoorlDienst* 1952, **9**, No. 8, 302-3.

Since maize ripens late in the Netherlands it is not possible to grow a catch crop immediately after the harvest, as is done with other cereals. In order to overcome this objection it is suggested that : (1) an August-sown catch crop of Westernwolths ryegrass should be grown immediately before maize, 2) the maize should be undersown with serradella. Both suggestions were carried out in the Rijk of Nijmegen with success. The ryegrass was sown n August after potatoes or rye at the rate of 60 kg. per ha. and an autumn cut of grass for silage was taken. A dressing of 400 kg. per ha. of N was applied in February and the grass was cut again for ilage towards the end of April. The ryegrass stubble was then ploughed under in preparation for a maize crop. Serradella was sown, under the maize, at the rate of 30 - 46 kg. per ha. and after the maize harvest was strip-grazed.—W.J.B.

544 AGUZZI, G. Ricerche su la densità e la disposizione delle piante, in varietà e ibridi di mais, coltivati in asciutto e in irriguo, nella pianura emiliana. [**Investigations on plant density and spacing of maize hybrids and varieties grown with or without irrigation in the Emilia Plain (Italy).**] *Ann. Sper. agr.* 1952, **6**, No. 5, 1329-50, bibl. 13, English summary p. 1349. [Ist. Agron. Gen., Univ. Bologna, Italy]

The trials described were carried out in 1950-1 on layey, fertile soil at Corticella, near Bologna, where maize is grown both with and without rrigation, to compare certain maize hybrids grown at different plant densities and spacings with local varieties. The results showed that the best plant densities without irrigation were : (a) Wisconsin 55 and Macario, early, 6 to 6.5 plants per sq. m. ; b) Wisconsin 464, Nostrano dell'Isola and Ohio M. 5, medium-early, 4.5 to 5 plants per sq. m. ; and, under irrigation: (a) Wisconsin 255, early, 7.5 plants per sq. m.; (b) Ohio M. 15, U. 32, Pioneer 340, cagliolo 23 A, medium-early and medium late, to 5.5 plants per sq. m. ; (c) U.S. 13, late, 4 plants per sq. m. ; (d) Scagliolo Gigante, very late, 3.5 plants per sq. m. The hybrids required the same plant densities as the local varieties. The plants grown in square clumps yielded slightly more, and matured earlier, than did the plants grown in rows. As the plant density increased there was an increase in the number of sterile plants, in the attacks by corn-borer and smut, and in the height of ear insertion. Irrigation raised the grain yields, especially of the late types and at the higher plant densities. —E.B.O.

545 HOFMEYR, J. D. J. **The origin and history of maize.** *Fmg in S. Afr.* 1952, **27**, No. 319, 451-2. [Agric. Res. Inst., Pretoria]

546 FARM AND HOME RESEARCH. **New hybrid corn shows promise of reducing bird damage.** *Fm Home Res.* 1952, **37**, No. 279, 87 and 96, illus.

A note is given on work in Ohio on the development of early-maturing maize hybrids with a thick, heavy husk, giving protection against damage to the crop by birds. It is thought that bird-resistant hybrid varieties may be produced within 3-4 years. —P.J.B.

547 ROUSSEAU, M. La culture du maïs-grain. Les résultats obtenus en 1951. [**Maize breeding. Results of trials in 1951.**] *Rev. Agric., Brux.* 1952, **5**, No. 3, 235-9.

Trials were carried out at Melle and Lokeren (Belgium) in 1951 to compare American and Dutch maize hybrids and local open-pollinated varieties. The varieties C.I.V.2 and C.I.V.7 gave the highest yields. From these trials and from observations in the Netherlands and the North of France the following varieties, now on the market, are provisionally recommended : Wisconsin 240, Nodak 301, Wisconsin 255 and Goudster.—K.L.

548 NALDI, L. Due nuovi ibridi di mais : Insubria 133, Insubria 524. [**Two new maize hybrids : Insubria 133 and Insubria 524.**] *Ital. agric.* 1952, **89**, No. 8, 550-3, bibl. 2, illus. [Sta. Sper. Maiscolt., Bergamo, Italy]

A description is given of Insubria 133 and Insubria 524 both bred at the above Station, the former being the Italian equivalent of Wisconsin 641 AA and the latter of Wisconsin 355. Their characteristics are described.—E.B.O.

549 ANDRES, J. M. Heterosis en maíces dentados y córneos. [**Heterosis in dent and flint types of maize.**] *Idia* 1952, No. 54, 16. [Agric. Vet. Fac., Buenos Aires]

Trials were carried out from 1943-5 and from 1948-9, in which a comparison was made between the yields obtained from three types of hybrids : dent × dent, flint × flint and flint × dent. On the average, flint × dent hybrids gave the highest yields.—W.J.B.

550 Terre Marocaine. La Conférence Internationale du Maïs Hybride de Zürich et ses enseignements pour le Maroc (Février 1952). [**The International Conference on Hybrid Maize at Zurich and its conclusions of interest for Morocco (February, 1952).**] *Terre maroc.* 1952, **26**, No. 271, 203-20.

The object of this Conference, convened by FAO, was to examine the work on hybrid maize carried out in Europe and North Africa in 1951 and to organize the experimental work for 1952. The principal matters treated are summarized. Tables give the results of comparative trials carried out with American hybrids at Rabat in dry cultivation, and at Boulaouane and Doukkala under irrigation, in 1951.—E.B.O

551† Coyola, G. and Etchebarne, J. La production des semences de maïs en France. [**Production of maize seed in France.**] *Potasse* 1952, **26**, No. 193, 10-14, illus.

The production of maize seed is regulated by the Official Commission for the Control of Maize Seed. Its membership is given and its functions are outlined. The actual work of control is carried out by the National Federation of Maize Seed Producers of which the authors of this paper are President and Director, respectively. For production of maize seed, France is zoned for varieties which are very early, early, fairly late and late. Several inspections are made. These begin before sowing to ensure isolation of the plots and they continue at intervals until the seed is packed. To qualify for certification, the seed must not only be produced satisfactorily but it must have a moisture content not exceeding 15%, impurities not exceeding 2% and a germination capacity of at least 85%. In the case of forage maize, homogeneity of seed colour is no longer accepted as an adequate criterion of purity; there must also be a guarantee of varietal purity. Since 1949 there has been a steep rise in the areas devoted to production of seed of both cob maize and forage maize. By 1953 France expects to be self-supporting in the production of cob-maize seed. She is already an exporter of forage-maize seed.—D.B.

552 Andrew, R. H. **Volume changes and germination of sweet corn kernels at different temperature sequences.** *Agron. J.* 1952, **44,** No. 9, 473-6, bibl. 10. [Wis. Agric. Exp. Sta., Madison]

The studies were carried out on 2 sweet corn hybrids and their inbred parents. The growth responses in terms of changes in seed volume during germination, disease reactions and germination percentages of seed of the different strains were determined under the following germination regimes : (a) 10 days of exposure to 50°F., followed by 6 days at 70°F. ; (b) 5 days of exposure to 50°F., 2 days at 70°F., 5 days at 50°F. and 4 days at 70°F.; (c) 2 days of exposure at 70°F., 5 days at 50°F., 2 days at 70°F., 5 days at 50°F. and 2 days at 70°F. All these sequences gave 10 days at 50°F. and 6 days at 70°F. The different regimes resulted in significant differences in seed-volume changes. A period at 70°F., following initial water imbibition at 50°F., resulted in a greater seed-volume increase than did initial imbibition at 70°F., followed by a period at 50°F. At the end of the germination regime periods, the range of seed-volume increase was from 110 to 172%. Regime (b) resulted in the greatest increase in seed volume. The low initial imbibition at 50°F. was most effective in producing ultimate increases in seed volume. There were highly significant differences between the regimes in respect of seed germination. The lowest germination percentage followed sequence (c) ; a warm period, followed by a cold period was less favourable to germination than a cold period, followed by a warm period. The average percentages of weak plants following exposure to regimes (a) and (c) were 11 and 27, respectively. Initial high temperatures, followed by low temperatures increased damage to seed by fungal pathogens.—P.J.B.

553 Duffield, P. C. **Combination insecticide-fungicide seed treatments for corn.** *J. econ. Ent.* 1952, **45,** No. 4, 672-4. [Iowa Agric. Exp. Sta., Ames]

In greenhouse trials, different lots of maize seed were treated with Lindane, Aldrin and Methoxychlor, respectively, and stored for 40 weeks. The effect of these insecticides on the seed was studied by periodic germination tests. Green weights of the tops were also determined at the time of the last germination test. In field trials 3 dosages of Lindane, Aldrin, Methoxychlor and Dieldrin, respectively, were applied to maize seed which was then stored for 12 weeks. At sowing time a duplicate series of treatments was made. Half of each of these lots of stored and non-stored seed was treated with the fungicide Arasan. Detailed results are given of the number of plants and yield per plot obtained from each treatment. The general conclusions were that Lindane had the most adverse effects on the seed under all conditions, that the insecticidal seed treatment should preferably be given shortly before sowing, and that a suitable fungicide should be used in combination with the insecticide.—E.B.O.

554 Nattrass, R. M. **Preliminary notice of the occurrence in Kenya of a rust (*Puccinia polysora*) on maize.** *E. Afr. agric. J.* 1952, **18,** No. 1, 39. [Dep. Agric., Nairobi]

55 TAYLOR, F. **The maize-stalk borer in the Eastern Orange Free State.** *Fmg in S. Afr.* 1952, **27,** No. 319, 450 and 452. [Div. Ent., Bethlehem]

uccessful control of this pest has been achieved y applications of 2.5 to 5.0% DDT powder in alc at the rate of 10 lb. per morgen [1 morgen = .1165 ac.]. The powder should be shaken into the pen funnel of the young maize plant while the talk-borer larvae are feeding there.—K.L.

56 APPLE, J. W. **Corn borer development and control on canning corn in relation to temperature accumulation.** *J. econ. Ent.* 1952, **45,** No. 5, 877-9, bibl. 3, illus. [Wisconsin Univ., Madison]

method for following the seasonal development f the European corn borer, *Pyrausta nubilalis*, by he use of temperature accumulation is proposed. This accumulation, named borer degree-days, is btained by summing the degrees above 50°F. from he daily means. Temperature accumulations can be sed as a guide to indicate the proper time to nake an evaluation of the corn borer infestation nd of the time to make insecticidal applications.—rom author's summary.

57 K. I. O. FORTNIGHTLY. **Control of maize weevil in cribs.** *K.I.O. Fortnightly* 1952, No. 241, 3.

58 BIRAGHI, A. Ulteriore contributo alla conoscenza del "nanismo ruvido" del mais. [**A further contribution to the knowledge of "rough dwarfing" in maize.**] *Ann. Sper. agr.* 1952, **6,** No. 4, 1043-53, bibl. 21, illus., English summary p. 1052.

t is proposed to give the name "rough dwarfing" o the form of dwarfing which appeared in epidemic orm in maize crops in Italy in 1949, and only poradically in 1950 and 1951. A characteristic eature of this disease, thought to be caused by a irus, is a roughness which can be felt on the lower ide of the leaves and, to a lesser extent, on the racts of the spike. This roughness is due to small alls along the nervatures, which can be seen with lens, sometimes with the naked eye. It is comletely absent on healthy plants.—E.B.O.

59 PORTJANKO, V. F. [**Concerning the light phase of development of maize.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1952, **84,** No. 5, 1077-80, bibl. 7. [Osipenkovskiĭ State Pedag. Inst. im. P.D. Osipenko]

esults are reported of an investigation with maize arieties bred in different geographical regions of ne U.S.S.R. These included typical short-day orms and forms which reacted only slightly to the hortening of the daylight period. Many varieties in the second group are able to develop in continuous illumination, when the other factors necessary for their ontogeny are present.—R.P.J.

560 EARLEY, E. B. **Percentage of carbohydrates in kernels of Station Reid Yellow Dent corn at several stages of development.** *Pl. Physiol.* 1952, **27,** No. 1, 184-90, bibl. 14, illus. [Univ. Illinois, Urbana]

The principal contribution of the present investigation is that of showing in Station Reid Yellow Dent maize the concentration of carbohydrates (reducing sugar, total sugar, sucrose, dextrin and starch) in the unfertilized ovules at silking time and in the kernels during the first 3 weeks following controlled pollination. The greatest change in the percentages of carbohydrates occurred during the second and third weeks after pollination. Percentages of total sugar, reducing sugar and sucrose were also determined in the silks and the pollen, figures for which are tabulated and very briefly discussed.—D.B.

561† GILLIARD, R. Conservation et conditionnement du mais. [**Conservation and conditioning of maize.**] *Potasse* 1952, **26,** No. 193, 71-6, illus. [Génie Rural, Pau, France]

The present method of drying maize cobs by hanging in the open air or by storing in barns is proving to be inadequate for heavy crops. New methods and equipment introduced by United States technicians are described and illustrated.—D.B.

MILLET AND SORGHUM

562 NELSON, C. E. **Effects of spacing and nitrogen applications on yield of grain sorghums under irrigation.** *Agron. J.* 1952, **44,** No. 6, 303-5, bibl. 3. [Wash. Agric. Exp. Sta., Pullman]

Three grain sorghum varieties, Early Hegari, Martin and Double Dwarf White Sooner were grown at the Moses Lake Development Farm in the Columbia Basin, Washington, in 1950 at 3 densities (228,000, 150,000 and 72,000 plants per acre) combined with each of 4 N treatments ; nil, 80, 160 and 240 lb. N. per ac. There were no significant interactions between yield and plant spacing, or variety. The application of 80 and 160 lb. N. per ac. increased mean grain yields by 31.4 and 40.7 bu. per ac. compared with the control. The 240 lb. N. per ac. treatment did not significantly increase yields above those where 160 lb. N. per ac. were applied. The mean protein content of the grain of the 3 varieties rose from an average of 7.5 to 11.5 % as N treatment increased from nil to 240 lb. per ac. N. Early Hegari had a lower protein content, at all levels of N treatment and plant spacing, than Martin and Double Dwarf White Sooner. —P.J.B.

563 Ferguson, L. A. C. **Sorghum news.** *Rhod. agric. J.* 1952, **49,** No. 5, 270-1. [Matopos Res. Sta.]

A brief account is given of the work in progress in S. Rhodesia on the improvement of sorghum varieties and the development of sorghums as food for livestock and man. Four types of plants are aimed at: (a) double dwarf, intended for mechanical handling; (b) dwarf, for both hand or machine harvesting; (c) dual purpose; (d) sweet-stemmed leafy, for silage. The problem of the susceptibility of sorghums to bird damage is being tackled by investigating, (1) the relative resistance of plants under equal exposure to damage and, (2) the genetic factors which control resistance, and the incorporation of these factors into high-yielding, palatable plants. The belief that early sowing would prevent bird damage was not borne out by experiments. The most popular varieties for 1952-3 are likely to be: the double dwarfs Caprock and Plainsman; the dwarfs Hegari and Rustenberg; the dual purpose Haakdoorn; and the sweet silage variety YSH.—K.L.

564 Grobbelaar, W. P. **Kaffircorn seed.** *Fmg in S. Afr.* 1952, **27,** No. 318, 424, 435 and 446. [Coll. Agric., Potchefstroom]

Brief descriptions are given of the following varieties of kaffir corn [*Sorghum vulgare*], Radar, Birdproof, Martin and Hegari. Although Radar was originally resistant to witchweed (*Striga lutea*), recent investigations have shown that where the soil is heavily infested with witchweed all Radar seed is not resistant to it. Radar is not resistant to birds, aphids (*Aphis*) or the *Astylus* beetle. Originally the so-called Birdproof kaffir corn grew to a height of 6-7 ft., but it has now been replaced largely by a short type which grows to a hight of 4-5 ft. Both types have bitter, dark brown seed. Resistance to birds is subject to both the bird population and the amount of kaffir corn, millet and other grasses occurring in a particular area. Two, short, early-maturing types of kaffir corn, Martin and Hegari are suitable for growing in areas where witchweed and birds are not troublesome.—K.L.

565 Stephens, J. C. and Quinby, J. R. **Yield of hand-produced hybrid sorghum.** *Agron. J.* 1952, **44,** No. 5, 231-3, bibl. 7, illus. [Texas Agric. Exp. Sta.]

Over the period 1942-50, the yield of an F_1 hybrid grain-sorghum, Texas Blackhull Kafir × Day Selection, was compared with that from commercial varieties. In one trial, lasting 8 years, the average yield of the hybrid exceeded that of the highest yielding commercial variety by 20%. The hybrid would be acceptable as a combine-type sorghum. [See also *Fld Crop Abstr.* 3 : 431 and 5 : 1121.]—W.J.B.

566 Mjagkov, N. V. [**Ways of increasing the yield of millet** (***Panicum miliaceum***).] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 2, 25-31. [Pučežskiĭ Region, Ivanov Province]

An experiment in 1949 showed the advantage of sowing the best, uniform seeds, as a high yield of grain was obtained with an absolute weight of 6.7 g. Sowing in drills gives the highest yield. To improve germination, the seeds, before sowing, should be soaked in water at room temperature, 17 to 18°C., and then in hot water at 45 to 50°C., followed by gradual cooling. The seed should not be left in water at room temperature for more than 72 hours, as, after that time, the seeds begin to germinate and the water becomes acid.—R.P.J.

567 Geering, Q. A. **A cotton stainer (*Dysdercus superstitiosus* Fabr.) as a potential pest of sorghum.** *Emp. J. exp. Agric.* 1952, **20,** No. 79, 234-9, bibl. 10. [Cott. Res. Sta., Namulonge, Uganda]

D. superstitiosus, a major pest of cotton, severely attacked a large crop of dwarf sorghum in northern Nigeria in 1950. Field observations suggest that in northern Nigeria the indigenous, sorghum variety, which is a tall, late-maturing type, grown exclusively for food, may be resistant to stainer-breeding, but that the dwarf sorghum variety appears to be particularly susceptible. The significance of this apparent change in the behaviour of stainers is discussed, particularly with reference to new or established sorghum-growing areas in other African territories.—K.L.

RICE

568 Coyaud, Y. Les possibilités rizicoles de la Guyane française. [**The possibilities of rice cultivation in French Guiana.**] *Agron. trop.* 1952, **7,** No. 4, 355-66, bibl. in text, illus.

Rice cultivation in French Guiana is confined to some small areas of hill rice in forest clearings. A survey made in various regions has shown that there are great possibilities for developing this crop. It is thought, however, that successful rice cultivation could be developed by mechanical means only. The present programme for the new rice areas is to sow rice in water 5-8 cm. deep and to alternate rice with hoed crops, e.g., soyabean, or with grass. As there are no local experimental stations for rice, it will be necessary at first to employ the rice varieties selected or recommended by the experimental stations of British Guiana and Dutch Guiana. Some of these varieties are described.—E.B.O.

569 Hercher, P. La culture du riz dans le Gharb en 1951. [**Rice cultivation in the Gharb (French Morocco) in 1951.**] *Terre maroc.* 1952, **26,** No. 269, 119-25.

nformation is given on rice growing in French Iorocco in 1951 where the area under this crop was 500 ha. The seed was imported mainly from Italy, 'rance, Hungary and the USA and sowing took lace from 10 April to 6 July. Early sowing appeared to give the best results. Depending on the oil and the crop variety grown, the irrigation water equired by the crop was 15 to 22 thousand cu. n./ha. The variety Balilla gave the highest yields 50-75 q./ha.). The other principal varieties grown vere : Magnolia, Rinaldo, Bersani, Dougna Shali, Razza 77, Maratelli, Americano 1600 and Sesia.—.B.O.

70 BERTRAND, P. Les conditions de la culture du riz dans le Haut-Donnaï (Viet-Nam). [**The conditions of rice growing in the High-Donnaï (Viet-Nam).**] *Agron. trop.* 1952, **7,** No. 3, 266-75, illus.

The conditions under which rice is grown in the nountains of South Viet-Nam are described and ompared with those in Cambodia.—From author's ummary.

71 PIACCO, R. Le razze di riso coltivate in Italia. [**The rice varieties grown in Italy.**] *Ital. agric.* 1952, **89,** No. 8, 554-9, illus. [Sta. Sper. Risicolt. Colt. Irrig., Vercelli, Italy]

'he 24 principal rice varieties grown in Italy are lescribed and their area of cultivation given. [See lso *Fld Crop Abstr.* 5 : 1133.]—E.B.O.

72 ABEYRATNE, E. **A preliminary note on an unrecorded group of paddy varieties occurring in Ceylon.** *Trop. Agriculturist* 1952, **108,** No. 1, 21-8, illus.

'hirty early maturing varieties of rice cultivated in he North-Central Province of Ceylon and known y various local names, appear to belong to a single omogeneous group, designated by the author as he "Heenati group." The morphological and hysiological characteristics which distinguish this roup are explained. The Heenati group of varieties ll require a long daily photoperiod during the rowing season and all flower within 45 to 60 days om sowing. It is suggested that the Heenati roup should be regarded as one variety.—W.J.B.

73 NAUNDORF, G. Lucha contra el arroz rojo con derivados del 2,4-D mediante avionetas de fumigacion. [**Control of red rice by aerial application of 2,4-D derivatives.**] *Acta agron., Palmira* 1952, **2,** No. 3, 151-9, bibl. 4, illus. [Agric. Exp. Sta., Palmira]

xperiments mentioned in *Fld Crop Abstr.* 3 : 334 have been continued to determine methods of hibiting germination of red rice (*Oryza rufipogon*) infested soils. Equal proportions of 2,4-D acid nd 2,4-D sodium salt at the rate of 4 mg. per kg. of oil were most effective. The best control resulted from aerial spraying of a fine tilth in a humid condition.—W.J.B.

574 CRALLEY, E. M. **Control of white tip of rice.** *Ark. Fm Res.* 1952, **1,** No. 1, 5.

Notes are given on work done in Arkansas on the control of white tip of rice caused by the nematode *Aphelenchoides oryzae.* The nematode is seed-borne and effective control has been obtained by hot-water seed treatment, seed fumigation with methyl bromide, and seed treatment with nematocides. The use of methyl bromide at 1.25 lb. per 1000 cu. ft. for rice with 13% moisture content, with an exposure period of 12 hr., has given good control. Hot-water treatment is not practicable, except in the laboratory.—P.J.B.

575 PORTMAN, R. F. and WILLIAMS, A. H. **Control of mosquito larvae and other pests in rice fields by DDT.** *J. econ. Ent.* 1952, **45,** No. 4, 712-16, bibl. 3. [California Agric. Exp. Sta.]

Three effective methods for controlling the following pests by DDT treatment are described : the larvae of the mosquito *Aëdes dorsalis* ; the fairy, or tadpole, shrimps *Apus oryzaphagus* and *A. biggsi* ; and the larvae of the giant scavenger water-beetle *Hydrous triangularis.* The 3 last-named species damage rice seedlings. The first control method consists in treating the dry, cultivated soil of the rice-fields before flooding with a DDT-xylene type of water emulsion at the rate of 1 to 4 lb. of DDT per acre or a 50% DDT wettable powder suspension at the rate of 4 lb. of DDT per acre. In the second method, 50% DDT wettable powder at the rate of 1 to 4 lb. per acre is applied with the rice seed when it is sown, by aeroplane. In the third method, the flooded rice-fields are sprayed with a DDT-xylene type of water emulsion at the rate of ½ to 1 lb. of DDT per acre.—E.B.O.

576 GREEN, V. E. and STONER, W. N. **Rice culture on muck soils of the Everglades.** *Rice J.* 1952, **55,** No. 9, 8-12, bibl. 13, illus. [Everglades Agric. Exp. Sta., Belle Glade, Fla]

In 1950, a research programme was started in the Everglades of Florida to investigate the possibilities of growing rice on the peat and muck soils of this region. On Everglades peat soils, rice failed to grow beyond the seedling stage, as a result of what appeared to be Fe-deficiency, or As-toxicity. These symptoms could be avoided by foliage sprays of ferric tartrate, or $FeSO_4$. Applications of up to 1000 lb. per ac. of $FeSO_4$ resulted in early heading and good grain yields. Aluminium sulphate could replace some of the $FeSO_4$ when applied at a rate of 800 lb. aluminium sulphate per 300 lb. $FeSO_4$ per ac. From these results, it is suggested that both rice and other crops would benefit from Fe supplements on Everglades soils. $FeSO_4$ added to the first rice crop appeared to be sufficient for a second crop.—P.J.B.

577 CHANDRARATNA, M. F. **Photoperiod effects on the flowering of tropical rices.** *Trop. Agriculturist* 1952, **108,** No. 1, bibl. 17, illus.

Twenty-six varieties of rice, including 12 varieties from Ceylon and others from Indonesia, India and Burma, were subjected to a short photoperiod of 9 hr. per day. The shortening of the natural photoperiod caused a reduction of the interval between sowing and flowering in the case of all varieties, except Heenati (from Ceylon) and A-64 (from Bombay). The late varieties, as expected, proved particularly sensitive to a reduced photoperiod. Indonesian late varieties, however, were exceptional in showing a high degree of insensitivity. After plants of 5 varieties had been subjected to photoperiods (which were constant for each plant throughout its growth) varying from 6 to 16 hours, response curves were constructed for each variety showing the relationship between the photoperiod and the length of the sowing-to-flowering interval. The photoperiodic sensitivity of a variety can be deduced from the gradient of the response curve.—W.J.B.

578 ASHBY, H. K. **Padi manurial trials on smallholders' land in Kelantan. Season 1951-52.** *Malay. agric. J.* 1952, **35,** No. 4, 191-207.

With the aim of popularizing the use of artificial manures in the State of Kelantan, experiments were carried out on smallholdings to determine the effect on yield of applying a standard manurial mixture to plots of swamp-rice on a variety of soils. The standard mixed manure used contained, in 400 lb. of manure, 47 lb. N, 40 lb. P_2O_5 and 50 lb. K_2O. [Information supplied subsequently by author.] The main soil types on which experiments took place were coastal sand, poor sandy soil, medium clay-loam, and heavy clay. The following 4 manurial treatments were used in each experiment : (a) 200 lb. per ac. shortly before planting, (b) 200 lb. per ac. shortly before planting, followed by 200 lb. per ac. 6-8 weeks after planting, (c) control, no manure, (d) 200 lb. per ac. 6-8 weeks after planting. In the 173 trials successfully completed, the average yields from the control plots on coastal sand, poor sandy soil, medium clay-loam and heavy clay were 133, 174, 170 and 172 gantangs [gallons] of paddy per acre [no weights given]. On all soils, treatments (a), (b) and (d) significantly outyielded the control while treatment (b) significantly outyielded (a) and (d). The greatest response to all treatments was obtained on shallow coastal sands. The average increase in yield over the control resulting from treatment (b) was 198 gantangs per acre on shallow coastal sands and between 149 and 159 gantangs per acre on other soil types. Comparable results were obtained in experiments with hill-rice. The standard manurial mixture is to be recommended and distributed throughout Kelantan.—W.J.B.

579 FAO. **International Rice Commission. Report of the third session. Bandung, Indonesia, 12-16 May, 1952.** 1952, pp. 76.

Included in this report are summaries of discussions and recommendations from the working parties and commissions on (i) rice breeding and fertilizers, (ii) the reduction of losses in rice through improved methods of storage and processing, (iii) upland rice production, (iv) specific factors affecting rice production in different countries and (v) improved statistics on rice production.—P.J.B.

GENERAL

580 PENGRA, R. F. **Estimating crop yields at seeding time in the Great Plains.** *Agron. J.* 1952, **44,** No. 5, 271-4, bibl. 5.

The relationship between rainfall and crop yields in the Great Plains of the USA was studied from 1923-47 in 13 sub-humid areas of South Dakota where the average annual rainfall is 19 in. The crop year was divided into two periods : the pre-seasonal period (1 September to 31 March) and the seasonal period, i.e. from seeding to harvest (1 April to 31 July). In all areas receiving less than 11 in. of rain in the seasonal period there was a significant positive correlation between pre-seasonal rainfall and the yields of wheat, oats and barley. Consequently the yield of grain could be predicted at seed time from the rainfall in the immediately preceding pre-seasonal period. The economic risk of sowing grain when pre-seasonal rainfall falls short of 4 in. is indicated. Since rainfall in the crop-growing period rarely overcomes a deficiency of moisture at seed time the advisability of irrigation during the pre-seasonal period is discussed.—W.J.B.

581 NEHRING, K. Untersuchungen über das Tiefumpflanzverfahren bei Getreide. [**Investigations on the transplanting of cereals.**] *Z. Acker- u. Pflbau* 1950, **93,** No. 1, 1-22, bibl. 4. [Landw. Versuchssta. Rostock, Germany]

Experiments in the transplanting by hand of winter rye and winter wheat were conducted during 1946-9. The amount of labour involved was too great (approximately 600 to 750 man-hours per ha.) for the practice to be justifiable under normal circumstances, but the effect on yield was favourable. Success depends on transplanting at the right time, namely, at the same time that drilling is normally done and the plants must have developed the 4th or 5th leaf. Planting distance is of great importance; in the Rostock experiments the optimal distance in rows 20 cm. apart was for winter rye, 16 cm. or 6 plants per m., and for winter wheat 12.5 cm. or 8 plants per m. Wider spacing resulted in considerably reduced yields. The transplanted plots exibited : more vigorous and rapid growth than he drilled control, a dark bluish-green colour, igorous tillering (8 to 10 tillers per plant), in- reased strength of straw, and, under the con- litions of the experiment an increase of 10 to 30% n grain yield. The difference between the yield of ransplanted and drilled plots was less when the pplication of N was increased. The favourable ffect of transplanting is largely due to increased bsorption of N by the more strongly developed oot system, and small doses of N are thus enough o produce high yields. Hoeing out a drilled stand o the same planting distance as the transplanted tand did not produce the same increase in yield.—.M.R.

82 Tidsskrift for Planteavl. Sortsliste over korn 1952. [**List of cereal varieties, 1952.**] *Tidsskr. Planteavl.* 1952, **56,** No. 1, 110-29, illus.

Commission was set up in Denmark in 1950 to roduce a descriptive list of the main cereal varie- ies grown there. This is the first descriptive list. t includes : the winter-wheat varieties Weibull roica and Alba ; the rye varieties Petkus, Svaløf ongsrug II and Borris Perle ; the barley varieties bed Maja, Svaløf Ymer, Carlsberg, Weibull erta, Øtofte Fero, Svaløf Freja, Abed Rigel, lfa and Abed Archer ; the oat varieties Svaløf tål, Borris Opus II and Svaløf Ørn. Notes are iven on the origin, year of release, grain yield, rain quality, straw yield and varietal character- stics of each variety, together with the main results f varietal trials. Photographic illustrations are iven of the grain of the barley varieties listed.—.J.B.

83 Pfeiffer, R. Ergebnisse der Admonter Getreide-u. Silomaissortenversuche 1950/51. [**Results of the Admont cereal- and silo-maize variety experiments 1950/51.**] *Vers-Ergebn. Bundesanst. alp. Landw., Admont* 1951, No. 14, pp. 58, bibl. 6, illus. [Received 1952]

abulated data, graphs and short notes record the ehaviour of varieties of winter and summer barley, inter and summer wheat, rye and oats as regards ield of grain and straw, quality of grain, dates of ages of development, overwintering and attack y diseases. In the silo-maize trials (both American ybrids and Austrian-bred varieties), tabulated esults are presented for green weight, dry weight, rude protein, plant height, number and weight f heads, thickness of stems, number and thick- ess of leaves, and the dates of the important stages f development.—D.B.

84 Journal of the Department of Agriculture. Eire. **Field experiments 1949.** *J. Dep. Agric. Éire* 1950, **47,** 132-49. [Received 1952]

Results are given of (a) variety trials with spring wheat, barley, oats and potatoes, (b) trials on the use of a Gammexane organo-mercurial dust in controlling wireworm and seed-borne diseases in spring sown cereals and (c) trials on the use of MCPA for weed control in cereals. The trials were carried out in different counties in Eire.—K.L.

585 Aitken, T. R. **Effect of 2,4-D on qualities of western Canadian wheat, barley and oats.** *Sci. Agric.* 1952, **32,** No. 6, 317-32, bibl. 10. [Grain Res. Lab., Bd Grain Comm., Winnipeg, Manitoba]

This paper is divided into 2 parts. Part I deals with the effect of different rates of treatment with 2,4-D (amine, Na salt and ester) on the quality grading, bushel-weight and protein content of different varieties of bread wheat, durum wheat, barley and oats. Part II deals with the effect of 2,4-D on the milling, baking and other qualities of Redman wheat and on the malting and other qualities of barley. In the Part I trials, 4, 8 and 16 lb. of 2,4-D were applied to Thatcher, Redman and Stewart wheat; Vantage, Montcalm and O.A.C. 21 barley; Ajax, Exeter and Vanguard oats. The first treatment was given at the 4 to 6 in. high stage and the second at the heading stage. The results indicated that none of the varieties was consistently reduced in grade by any formulation, or rate, of 2,4-D treatment. The bushel-weight estimates gave inconclusive results. In general, the protein content of all varieties increased following treatment with 2,4-D, compared with untreated controls, though the increases were only occasionally significant. In the Part II trials, Redman wheat was sprayed with 12 oz. per ac. of 2,4-D ester acid equivalent on 9 successive dates from 10 May to 20 June. The results indicated that least damage was done if the plants were sprayed when about 2 in., or above 14 in. tall. When sprayed between these growth stages (just before, or during, tillering) there were considerable variations in grain quality. Treatment of wheat at about the time of tillering, reduced yield, but increased baking quality. In the trials with barley, Montcalm was used and the 2,4-D treatments were the same as for wheat, except that different dates of treatment were used, ranging from 10 May to 27 June. Barley treated 6 days before heading was most seriously affected in terms of reduced yield, high N content, low malt extract and high saccharifying activity. The grain of barley sprayed at other dates was comparable with the controls in malting quality.—P.J.B.

586 Scragg, E. B. **The effects of 'hormone' herbicides upon cereal crops.** *Ann. appl. Biol.* 1952, **39,** No. 3, 423-8, bibl. 7. [N. Scot. Coll. Agric., Aberdeen]

The phytocidal effects of hormone herbicides upon cereals include : (1) morphological abnormalities in the inflorescence and vegetative parts ; (2) damage to the ears of wheat and barley producing pairing of spikelets, instead of the normal alternate arrangement ; (3) the 'tweaking' of wheat ears—resulting in the formation of a compound grain containing 3 embryos ; (4) uneven ripening of the grain ; (5) weakness of straw and (6), in oats, secondary growth after harvest. To reduce these detrimental effects it is suggested that spraying with hormone herbicides should be avoided before the crops begin to tiller or immediately prior to the emergence of the ear. Unless the nature of the weed infestation demands it, rates of application greater than 1 lb. acid equivalent per ac. should not be used. Methoxone is less dangerous than the amine or ester forms of 2,4-D. Sodium 2,4-D appears to be relatively harmless but, owing to its low solubility, is not suitable for low-volume spraying.—K.L.

587 POHJAKALLIO, O. Ljusintensiteten i norra och södra Finland samt dess inverkan på odlingsväxterna. [**Light intensity in north and south Finland and its effect on crops.**] *Nord. JordbrForskn.* 1952, **34,** No. 2, 99-112, bibl. 17, illus., English summary p. 111.

Comparative studies are reported on light conditions during the summer months in north and south Finland, with particular reference to light intensity, elevation of sun and cloudiness. Photoperiods were longer in the north than in the south, but light intensity was greater in the south than in the north. As shown by the rate of growth of spring-sown cereals, these respective differences apparently counterbalanced each other ; thus the rate of growth of these crops was very much the same in north as in south Finland. [See also Abs. 793.]—P.J.B.

588 MITCHELL, J. and others. **Availability of fertilizer and soil phosphorus to grain crops, and the effect of placement and rate of application on phosphorus uptake.** *Sci. Agric.* 1952, **32,** No. 10, 511-25, bibl. 20, illus. [Univ. Saskatchewan, Saskatoon, Canada]

589 JENSEN, N. F. and WILLIS, G. H. **Small-grain nursery equipment.** *Agron. J.* 1952, **44,** No. 11, 590-2, bibl. 1, illus. [Cornell Univ., Ithaca, N.Y.]

Three items are described. They are : (a) a modified Jari rod-row cutter, (b) a tractor-mounted multiple-row drill and (c) a method of using paper-tape rolls for sowing cereals. In the case of (c), the cereal seed is spaced along the roll and then sealed into the roll by feeding it between vertical, rubber rollers. The tape roll can then be planted in the field by a modified hand-drill. Advantages claimed for the method include the saving of time in the spaced sowing of cereals, rapid germination and uniformity of seedling emergence.—P.J.B.

590 ENGLAND AND WALES. Ministry of Agriculture and Fisheries. Adv. Leafl. 404. **Heating of grain.** 1952, pp. 7, illus.

Heating in bulked or bagged grain may occur if it becomes infested with insects or mites and if it becomes, or is stored, damp. Insects known to cause dry-grain heating in bulked or bagged grain include : the grain weevil (*Calandra granaria*), rice weevil (*C. oryzae*), lesser grain-borer (*Rhizopertha dominica*), Angoumois grain-moth (*Sitotroga cerealella*), flat grain-beetles (*Laemophloeus* spp.), saw-toothed grain beetle (*Oryzaephilus surinamensis*), book lice (Psocidæ) and the flour mite (*Tyroglyphus farinae*). Heating caused by insects may be controlled by killing them in one of the following ways : (a) fumigation with methyl bromide (in silos where a circulatory plant is available) or carbon tetrachloride (poured on top of the grain in bins); (b) for grain in bulk on floors, or shallow bins, the infested areas can be treated by pouring a mixture of ethylene dichloride and carbon tetrachloride on the grain ; (c) bagged grain can be treated with fumigants under sheets.—K.L.

591 FREEMAN, J. A. ***Laemophloeus* spp. as major pests of stored grain.** *Pl. Path.* 1952, **1,** No. 3, 69-76, bibl. 16, illus. [Infest. Contr. Div., Hook Rise, Tolworth, Surrey]

During the past 10 years a number of outbreaks of *Laemophloeus* spp., as the principal or sole pest, have occurred in grain stored in the United Kingdom, principally in Manitoba wheat stored for long periods. These infestations have been mainly in grain held in large shallow bulks on floors, but some have occurred in silos. There has been none of consequence in bagged grain. While control in suitable silos is relatively easy, it is difficult in floor-stored bulks, particularly when there are steep temperature gradients, such as occur in the advanced stages of infestation. Some success has been achieved in Canada by spot treatment with chloropicrin and carbon tetrachloride. During the outbreaks in the United Kingdom, no treatment other than removal of the grain was possible, but subsequent work has indicated that general and spot treatment with carbon tetrachloride or mixtures of carbon tetrachloride and ethylene dichloride (approximately at the rate of 1 gal. to 7 tons of grain) are effective.—E.B.O.

LEGUMES

SOYABEAN

592 LARSON, Sara. **Soyabeans in mid-western farming.** *Trans. Kans. Acad. Sci.* 1950, **53,** 28-43, bibl. 38, illus. [Received 1953] [Kansas State Coll., Manhattan]

Among the topics dealt with are : geographical actors influencing soyabean production in the orn Belt States, methods of sowing, cultivation, arvesting, marketing, utilization and processing of oyabeans and a comparison of soyabean produc- ion in the Corn Belt with that of other regions in he USA.—P.J.B.

93 WEISS, M. G. and others. **Correlation of agronomic characters and temperature with seed compositional characters in soyabeans, as influenced by variety and time of planting.** *Agron. J.* 1952, **44,** No. 6, 289-97, bibl. 12. [U.S. Reg. Soybean Lab., Pl. Industr. Bur., U.S. Dep. Agric.]

tudies were made of the correlation between 5 ariables in trials with 5 soyabean varieties, sown t 5 different dates during 3 years at : Ames, owa ; Urbana, Illinois ; and Lafayette, Indiana. 'he following characters were significantly cor- elated among all varieties : large seed size with ow iodine-number of oil, lateness of maturity with ow protein content and high oil content, low mean emperature during the period from flowering to aturity with high iodine-number of oil, high oil ontent with low iodine-number of oil and high rotein content with low oil content. Among the eans of the 5 different sowing dates used, the ollowing characters were significantly correlated : arge seed size with low iodine-number of oil, late- ess of maturity with low oil content and high odine-number of oil, high mean temperature with igh oil content, number of days from flowering to aturity with high oil content, low mean tempera- ure during the period from flowering to maturity ith high iodine-number of oil, high oil content ith low iodine-number of oil and high protein ontent with low oil content. The association of haracters differed among varieties at different ates of sowing in the following correlations only : ed-size and oil content, protein and iodine- umber of oil, days from flowering to maturity with l content, and protein content with oil content. decreased length of the period from flowering maturity, caused by late sowing, was correlated ith low oil content in Mandarin, the earliest ariety, and Boone, the latest variety. In the other id-season varieties this correlation was not pparent. In the mid-season varieties Mukden and unfield, high protein content was correlated with w oil content ; this correlation did not reach a gnificant level in the other varieties.—From ithors' summary.

94 PROBST, A. H. and CUTLER, H. G. **Blackhawk soybeans for Indiana.** *Sta. Circ. 385 Ind. agric. Exp. Sta.* 1952, pp. 11, illus.

lackhawk is a selection from a cross between ukden and Richland and is adapted to the muck nd marshland soils of northern Indiana and the uthern halves of Minnesota, Wisconsin and Michigan. In Indiana it yields an average of 4.7 bu. per ac. more than Mandarin and 3.7 bu. per ac. more than Earlyana. It is one day earlier in maturing than Earlyana, 6 days earlier than Hawkeye and 9 days later than Mandarin. Blackhawk yields an average of 1 bu. per ac. less than Earlyana on mineral soils, but the oil content of its seed averages 20.8%, compared with 20.3% for Earlyana. Blackhawk is very erect in growth habit and is easy to harvest by combine. Where sowing is delayed until 10 June in northern Illinois, Blackhawk outyields Hawkeye and Lincoln, which are too late in maturity to ripen fully ; where Hawkeye matures fully, however, it outyields Blackhawk by a considerable margin.—P.J.B.

595 ROMPIETTI, A. Rilievi sui rendimenti e sul potere germinativo della soia in ambiente siccitoso. [**Observations on the yield and germination capacity of soyabeans grown in a dry environment.**] *Ann. Sper. agr.* 1952, **6,** No. 5, 1307-28, bibl. 2, English summary p. 1328. [Ist. Agron. Afr. Ital., Firenze, Italy]

Trials were carried out near Florence in 1948-50, to study the possibility of introducing soyabean cultivation. Sixty-six varieties with different vegetative cycles, from different countries, were tested. Results indicated that summer drought during the growing season affected unfavourably the yield and the germination capacity of the seeds. It favoured the formation of hard seeds, especially in the varieties having brown or black seed-coats. Of the varieties tested, only the following, which showed some drought resistance and gave relatively good yields and germination percentages, gave promise of successful cultivation : Giessener 850, Giessener 71 (early) ; Bitter of Riesen, Montagnana A, Gialla Lombarda, Marron 5 B (medium) ; and Wilson and Sennari (late). [See also *Fld Crop Abstr.* 4 : 400.]—E.B.O.

596 SHAW, W. C. and others. **The effect of chemicals on soybeans and Sudan grass and their persistence in the soil when applied as pre-planting, pre-emergence and post emergence sprays.** *Proc. 5th Southern Weed Conf., 1952* 1952, 15-22, bibl. 3. [Weed Invest. Div., Pl. Industr. Bur., U.S. Dep. Agric., Beltsville, Md]

The following herbicides were used in the trials : 2,4-D alkanolamine salt, TCA, isopropyl N-(3-chlorophenyl)- carbamate (ClIPC), DNOSBP alkanolamine salt, diethanolamine salt of maleic hydrazide (MH), sodium 2,4-dichlorophenoxyethyl sulphate (SES), pentachlorophenol (PCP), KOCN and phenylmercuric acetate (PMA). The pre-sowing spray treatments were made to freshly prepared seed-beds, approximately 5 weeks before sowing. The pre-emergence treatments were made immediately before sowing and the post-emergence treatments made when the soyabeans were 8-10 in. tall. In the pre-sowing trials, ClIPC, DNOSBP, 2,4-D and TCA were all effective in controlling both broad-leaved and grass weeds, whilst ClIPC and DNOSBP were the most effective. ClIPC at rates of up to 20 lb. per ac. and DNOSBP at rates of up to 24 lb. per ac. gave over 90% control of all weed species for at least 70 days after application. Little or no injury was caused to soyabeans sown 30 days after the soil treatment ; DNOSBP caused little injury to the Sudan grass, while ClIPC prevented emergence. In terms of their persistence in the soil, the herbicides were grouped in the following order, with the most persistent first : ClIPC, DNOSBP, PCP, TCA, SES, 2,4-D, PMA, MH and KOCN. In the pre-emergence trials, ClIPC, DNOSBP and PCP were the most effective materials, but all caused some stand reduction in soyabeans and all were ineffective when used on Sudan grass. In limited post-emergence trials, ClIPC, DNOSBP and SES were all relatively low in phytotoxicity to soyabeans.—P.J.B.

597 Chappell, W. E. **Pre-emergence weed control studies with soybeans.** *Proc. 5th Southern Weed Conf., 1952* 1952, 127-8. [Virginia Agric. Exp. Sta., Blacksburg]

In trials at Warsaw, Virginia, on a sandy-loam soil, the following herbicides were compared as pre-emergence weed-control treatments : DNOSBP (Dow General) at 2.5 lb. per ac., xanthogen disulphide (Sulfasan) at 2 gal. per ac., Na pentaschlorophenol (Dowcide G pellets) at 20 lb. per ac., 2,4-dichlorophenoxyethylsulphate (Crag Herbicide No. 1) at 2 lb. per ac. and O-chlorophenylsulphonyl fluoride (Penn salt Np-128) at 20 lb. per ac. Dow General and Dowcide G pellets gave almost 100 % weed control following application immediately after sowing the soyabeans ; soyabean yields were significantly higher than those from untreated, unhoed control plots. Sulfasan was ineffective against weeds and did not significantly raise yields above those of the controls. Penn salt Np-128 gave good weed control, but like Sulfasan, did not give yields approaching those of the plots treated with Dow General and Dowcide G. Crag Herbicide No. 1 caused stunting of the soyabean plants and gave poor weed control. None of the treatments affected the protein and oil content of the soyabeans.—P.J.B.

598 Lyons, J. C. and Earley, E. B. **The effect of ammonium nitrate applications to field soils on nodulation, seed yield, and nitrogen and oil content of the seed of soybeans.** *Proc. Amer. Soc. Soil Sci.* 1952, **16,** No. 3, 259-63, bibl 8. [Illinois Univ. Agric. Exp. Sta., Urbana]

Trials were carried out at 2 locations in Illinois during 1947 and 1949. All soils were adequately supplied with Ca, P and K. In one set of trials, ammonium nitrate was applied before sowing and ploughed under, rates of treatment ranging from 100 to 1000 lb. N per ac. In a second set of trials, side-dressings of ammonium nitrate at rates varying from 100 to 500 lb. per ac. were made at 3 dates corresponding to 8, 20 and 42 days after emergence. Nodule counts were taken at 5 and 10 weeks after emergence. In 1947, a hot, dry year, the highest rates of ploughed-under N reduced nodule numbers almost to nil at 5 weeks after emergence, though numbers rose slightly by 10 weeks after emergence. In 1949, a wet year, nodule numbers were reduced by only 35% following the 1000 lb. per ac. N treatment, compared with untreated controls. Side-dressing treatments reduced nodulation in 1947 far less than did the ploughed-under N at equivalent rates of treatment. In 1947, seed-yield increases following ploughed-under N applications were marked. Similar yield responses followed side-dressing treatment, responses being greatest for the earliest date of application. In 1949, there were little yield responses to any N treatment made. In 1947, N treatments increased the N content of the seed and decreased the oil content ; in 1949 the different treatments had no appreciable effect on the N- or oil-content of the seed. From these results it was concluded that rainfall and temperature during the growing seasons have a direct influence on the sufficiency of the symbiotically-fixed N for soyabean growth.—P.J.B.

599 Holman, L. E. and Carter, D. G. **Soybean storage in farm-type bins. A research report.** *Bull. 553 Illinois agric. Exp. Sta.* 1952, 451-96, illus.

The results are given of 6 years' studies of the storage requirements of soyabeans. Included in the scope of these studies were the following aspects : conditions affecting the quality of stored soyabeans, including moisture content, moisture movement and accumulation, temperature, insect damage, field damage to the bean and storage-bin damage ; methods of drying soyabeans having a high moisture content, including natural ventilation, fan ventilation with unheated and heated air with moving and blending ; the practical constructional requirements of efficient farm storage bins. From the studies, it was concluded that moisture was the main cause of deterioration during storage. Soyabeans with 10% moisture remained in good condition for up to 4 years, and with 12% moisture for nearly 3 years. At 14% moisture content, the beans would store safely during the winter months ; where the moisture content of the beans was above 15%, safe storage was precluded. For conditioning soyabeans, best results followed drying with forced, heated air ; or forced, unheated air in cases where he air temperature was above 60°F. and the re- ative humidity below 75%.—P.J.B.

ROUNDNUT

00 **Guillemin, R.** Études agronomiques sur l'arachide en A.E.F. (Oubangui-Chari, Tchad). [**Studies on the agronomy of groundnuts in French Equatorial Africa (Ubangi-Shari and Chad).**] *Oléagineux* 1952, **7,** No. 12, 699-704. [Serv. Rech. Agron. A.E.F., Brazzaville]

n account is given of investigations carried out ince 1946 to study sowing date, plant density and arieties of groundnuts. The main results were : a) there was a definite advantage in sowing early, the first half of May or a little later, as the crops own late, especially at the end of July, were ften almost completely destroyed by rosette isease ; (b) high yields and control of rosette isease were obtained by high plant densities, up to 50,000 plants per ha. ; (c) no groundnut varieties efinitely superior to the local types have yet been ound. With regard to (a), it is noted that the native armers in Ubangi grow 2 consecutive groundnut rops in the same season, the second of which is ee from rosette disease. This freedom is probably ue to the effect of maize plants, grown with roundnuts, which inhibit the multiplication of *phis laburni*, the insect vector of rosette disease. –E.B.O.

01 **Prevot, P.** Les bases du diagnostic foliaire: application a l'arachide. [**The basis of foliar diagnosis : its application to groundnuts.**] *Oléagineux* 1953, **8,** No. 2, 67-71, bibl. 2, illus.

n account is given of the investigations carried ıt to evaluate the mineral deficiencies of ground- ıt crops in French Africa. Foliar diagnosis, in njunction with agronomical trials, is considered n effective and rapid technique for this purpose. mparisons of the response of groundnuts to rtilizer application in many trials has made it ssible to determine the critical levels of N, P and , i.e., the levels of these elements in the leaves, pressed in % of dry matter, above which an plication of fertilizers may not be profitable. hese critical levels have been fixed provisionally 4% for N, 0.2% for P and 1% for K, but may be anged in the course of research to take into ac- unt differences due to the climate and the variety nployed. [See also *Fld Crop Abstr.* 5 : 1157.]— B.O.

EA

2 **Leefe, J. S. Chemical control of weeds in peas.** *Sci. Agric.* 1952, **32,** No. 11, 581-5, bibl. 7, illus. [Dom. Exp. Sta., Kentville, N.S., Canada]

In trials during 3 years, the following herbicides were applied to peas, grown for processing, as pre-emergence treatments : calcium cyanamide (rates ranging from 60 to 600 lb. per ac.), 2,4-D isopropyl ester at 0.75 lb. per ac., 2,4-D low-volatile ester at 0.75 lb. per ac., XP4OG (50% xanthogen disulphide + oils and emulsifiers) at 3 qt. per ac. and 54% DNOSBP amine salt at 4 and 8 qt. per ac. The following were tested in post-emergence treatments : calcium cyanamide dust, sodium cyanamide, potassium cyanate, sodium isopropyl xanthate and the ammonium salt of DNOSBP. The trials were carried out in Nova Scotia, the chief weed species present being wild radish (*Raphanus raphanistrum*). Pre-emergence treatments were applied within 3 days before seedling emergence and post-emergence treatments when the peas were 6 to 8 in. tall and the wild radish showing a few flowers. In 1949 and 1951 when cool, damp weather followed post-emergence treatments, weed control was poor. In 1950, a year when hot, dry weather followed post-emergence treatments, the ammonium salt of DNOSBP gave excellent control of wild radish, following treatment at rates of either 1.5, or 3 qt. per ac. Among the pre-emergence treatments, the amine salt of DNOSBP gave effective control of wild radish and was the only material which controlled this weed right up to the time of harvesting the peas in both years in which it was tested.—P.J.B.

603 **Ditman, L. P. and Burkhardt, G. Further experiments on pea aphid control.** *J. econ. Ent.* 1952, **45,** No. 5, 880-1, bibl. 1. [Maryland Agric. Exp. Sta.]

The trials described were carried out with wrinkled peas [*Pisum sativum*] of the Pride variety (a) to test several insecticidal dusts and low-volume sprays for controlling the pea aphid [*Macrosiphum pisi*] in the field ; (b) to study the control of mosaic disease by seed treatment and subsequent spraying ; and (c) to determine the effect of the insecticidal sprays and dusts, and of seed treatment, on stand and yield of shelled peas. The main results from these trials were : (i) low-volume water sprays of DDT and 4049 emulsion gave better control of pea aphid than did 1% DDT and 1% Parathion dusts ; at the doses used, the 4049 spray was superior to the DDT spray, but control was satisfactory with either preparation ; (ii) seed treatment with octamethyl pyrophosphoramide, at the rate of 8 oz/bu., was highly effective against the pea aphid, but caused a significant reduction in stand ; (iii) seed treatment as in (b) followed by 2 subsequent DDT emulsion sprays did not give satisfactory control of the pea mosaic disease in small plots.—E.B.O.

604 Virtanen, A. I. and Saubert von Hausen, S.

A method for determining, in pea cultures, the amount of molecular nitrogen fixed and the amount of combined nitrogen taken up from the soil. *Pl. and Soil* 1952, **4,** No. 2, 171-7, bibl. 4. [Biochem. Inst., Helsinki, Finland]

Pea seedlings were inoculated with effective and ineffective strains of *Rhizobia* before being transferred to jars containing clay soil with a pH of 6.0 and a content of 0.3% N and 14.1% organic matter. A nutrient solution containing no N was added to the soil during the course of the experiment. At the end of flowering, the plants were harvested. The average dry weight of the 4 plants per pot inoculated with the effective *Rhizobia* strain, was 5.752 g., compared with 2.641 g. for the plants inoculated with the ineffective strain. N uptake by the plants inoculated with the ineffective *Rhizobia* strain averaged 52 mg. per pot of 4 plants. The plants inoculated with the effective strain fixed an average of about 105 mg. of atmospheric N, i.e., about 67% of their N was obtained from the atmosphere and 33% from the soil. Two oat crops were sown in the pots after the removal of the peas. Where the 2 oat crops followed the peas inoculated with the effective *Rhizobia* strain, they contained an average of 57.5 mg. more N than where they followed the peas inoculated with the ineffective strain. The after-effects of the peas on the second oat crop were far smaller than those on the first crop. Oat roots appeared to be more effective than pea roots in taking up soil N. The methods used in these experiments indicated a reliable way of assessing the uptake of N by peas grown in a soil that may contain effective *Rhizobia* strains.—P.J.B.

605 Stafford, Helen A. **The distribution and development of enzymes in pea seedlings.** *Bull. Torrey bot. Cl.* 1952, **79,** No. 5, 351-8, bibl. 14. [Biochem. Dep., Chicago Univ., Ill.]

The results are given of studies of the activity of cytochrome oxidase, succinoxidase, ascorbic oxidase, amylase and phosphorylase in respect to their distribution between the cotyledons and the root-shoot axis, in pea seedlings up to 6 days old. All the enzymes except ascorbic oxidase were found in ungerminated peas and all increased in activity on germination.—P.J.B.

606 Bottini, E. and Marsella, R. Contributo allo studio del molibdeno come elemento micro-nutritivo. [**A contribution to the study of molybdenum as a micronutrient.**] *Ann. Sper. agr.* 1952, **6,** No. 6, 1659-81, bibl. 32, illus., English summary p. 1679. [Sta. Chim.-Agr. Sper., Torino, Italy]

The effect of molybdenum was studied on plants of dwarf pea [*Pisum sativum*] grown in molybdenum-free sand to which fertilizers at different rates were added. Molybdenum was applied at the rates of 1, 5 and 10 ppm. of the sand and 7 repetitions of each treatment were made. Results showed that molybdenum favoured root growth, the formation of chlorophyll and its resistance to natural breakdown, but that it generally had a toxic effect on the development of the stems, leaves and pods and inhibited the absorption of nutrients. It is concluded that, for dwarf peas, molybdenum cannot be considered a micronutrient at the rates tested, and that an excess of this element in the soil is more harmful than a deficiency.—E.B.O.

BEAN

607† Péronet, A. La féverole. [**Horse beans.**] *Potasse* 1952, **26,** No. 196, 119-24, bibl. 7, illus.

Because it is rich in protein and carbohydrate, the horse bean (*Vicia faba*) is becoming increasingly popular in France as a farm crop for feeding to livestock. The spring varieties are more suitable than winter varieties for conditions in France. A brief account is given of the climatic requirements, cultivation and possible yields of the crop and its utilization either as dry fodder or silage.—D.B.

608 Soper, M. H. R. **A study of the principal factors affecting the establishment and development of the field bean** (*Vicia faba*). *J. agric. Sci.* 1952, **42,** No. 4, 335-46, bibl. 8. [Dep. Agric., Univ. Oxford]

A survey of bean crops was carried out in the Oxford area from 1947-9, with the object of ascertaining the causes of the decline in the acreage and yields of field beans. [The first part of the survey on farmers' methods, is summarized in Abs. No. 609.] It was observed that the season and the fertility status of the soil had a profound influence on the development of the crop. Hard winters caused crop losses sometimes amounting to more than 50% of the plants. A warm, dry, spring and an equable summer temperature favoured pod production more than hot, dry seasons. High plant densities caused a reduced rate of pod formation per plant over a wide range of conditions ; a reduction in stem formation on low-fertility fields ; a significant increase in pod production per acre on high-quality fields. Under conditions favouring vegetative growth, there appeared to be some competition between stem production and pod production, for the correlation between stems/plant and pods/plant found on low-fertility land and in dry seasons no longer held under good growing conditions. In an average crop there was a serious loss of flowers and partly matured pods (up to 85% of the flowers formed). This may be due to unsatisfactory pollination or self-infertility, inadequate availability of certain plant nutrients or unsuitable environmental conditions. *Botrytis cinerea* (chocolate spot), which appears to be associated with potash and/or phosphate deficiency, was capable of causing a high wastage of the crop, although this did not occur during the period of the survey.—From author's summary.

609 Soper, M. H. R. **Investigations into the field bean crop.** *Agriculture, Lond.* 1952, **59,** No. 5, 229-34, bibl. 2. [Dep. Agric., Univ., Oxford]

[This is a short and complementary version of the paper treated in Abs. 608.] A 3-year survey of bean crops grown in the vicinity of Oxford showed that a very wide range of cultivation practices existed. Crops on heavy land had an average of 12,000 more plants per ac. than those on light land, while the number of pods per ac. was 25% higher on heavy land. Calculated yields (on a pods-per-ac. basis) were 15.8, 18.5 and 21.3 cwt. per ac. for crops receiving no manure, artificial fertilizers and dung, respectively. On the farms surveyed, winter-sown beans were usually sown too late in the autumn. Pods per ac. on fields sown before 15 October, between 16 and 31 October and after 1 November averaged 783, 631, and 595 thousand, respectively. Increasing the sowing rates from 2 to 4 bu. per ac. resulted in significant increases in seed yields. Early sowing and a high sowing rate appeared to be more important for spring beans than for winter beans, because of the low rate of branching in the latter. Birds and aphids appeared to cause considerable damage to crops. To mitigate bird-damage, deep and early sowing, combined with stringing black cotton over the field in 20 yard squares, was of value. Aphids caused considerable damage to late-sown crops of spring beans. From limited studies, it appeared that the inclusion of oats with the bean crop resulted in little increase in the production of starch equivalent while it reduced the crude-protein production considerably.—P.J.B.

610 Reisch, W. Variabilitätsstudien an *Vicia faba* L. [**Studies of variability in *Vicia faba L.***] *Z. Acker- u. Pflbau* 1952, **94,** No. 3, 281-306, bibl. 57. [Landw. Hochsch. Hohenheim, Stuttgart]

611 Kiffmann, R. Morphologie und Systematik der landwirtschaftlich bedeutsamen Wicken- (*Vicia-*) und Linsen- (*Lens-*) Arten. [**Morphology and systematics of the species of *Vicia* and *Lens* of agricultural importance.**] *Z. Acker- u. Pflbau* 1952, **94,** No. 4, 422-79, bibl. 16, illus.

This illustrated study enables 19 spp. of *Vicia* and *Lens*, together with a large number of sspp., to be dentified. Information is also given on some German-bred strains. The German common names are given for each species and sub-species.—G.M.R.

612 Delanoue, P. Enseignements à tirer d'un traitement expérimental contre *Aphis rumicis* L. sur fèves en année sèche. [**Lessons to be learned from experimental treatment for control of *Aphis rumicis* L. in beans in a dry season.**] *C. R. Acad. Agric. Fr.* 1952, **38,** No. 4, 145-8. [Sta. Ent. Serv. Bot. Agron. Tunisie]

In Tunisia, the bean is an excellent crop to replace the bare fallow between the two wheat breaks in the rotation. The crop is, however, subject to loss from two causes : drought and aphids. During a dry season in which there was also an invasion of aphids the effect of insecticides on yield of the crop was studied. Thiophosphate used as a powder at 0.5% and 0.75% resulted in doubling the yield compared with untreated plants. BHC as a powder at 8%, gave but temporary control and was practically without effect on yield.—D.B.

613 Gliemeroth, G. Wasserhaushalt des Bodens in Abhängigkeit von der Wurzelausbildung einiger Kulturpflanzen. [**Water economy of the soil and its dependence on root type in some crop plants.**] *Z. Acker- u. Pflbau* 1952, **95,** No. 1, 21-46, bibl. 23, illus. [Univ., Göttingen]

The subject is studied in connexion with the rooting systems of field beans (*Vicia faba*), oats and barley. Close relations were found to exist between water-uptake capacity and the development and different type of root system in the plants studied, in which the density of rooting in the subsoil was especially important. The limited ability of *V. faba* to tolerate dry conditions, for example, is probably due not so much to especially high water requirements as to its poorly developed root system in the subsoil, which results in a low capacity for water uptake.—G.M.R.

GENERAL

614† Masefield, G. B. **The nodulation of annual legumes in England and Nigeria : preliminary observations.** *Emp. J. exp. Agric.* 1952, **20,** No. 79, 175-86, bibl. 5. [Dep. Agric., Univ. Oxford]

This paper describes observations on the weights of nodules borne on several leguminous crops in England and Nigeria. *Phaseolus vulgaris*, the only crop tested in both countries, had lower weights of nodules in Nigeria than in England. Groundnuts and cowpeas, and a few other crops in single observations, had a lower range of nodule weights in Nigeria than had field beans, peas, and *Phaseolus* in England, though with some overlapping between the higher Nigerian and lower English figures. Variations found in nodule weights within each country tend to support the hypothesis that high soil moisture is a main factor responsible for heavy nodulation in the field. Legumes may nodulate less in tropical soils simply because the soils are drier. In experiments with different spacings, the weight of nodules borne per plant was not found to vary with spacing. A higher plant population would therefore give a greater weight of nodules per acre. In England, much destruction of pea and bean nodules is caused by the insect *Sitona lineata* whose status as a nodule pest has received little attention but may explain some of the vagaries of bean yields. In Nigeria, nodulation of all crops was heavier on a soil type typical of northern Nigeria than at stations in southern Nigeria.—From author's summary.

615† RICEMAN, D. S. and POWRIE, J. K. **A comparative study of *Pisum*, *Vicia*, *Lathyrus* and *Lupinus* varieties grown in Buckingham sand in the Coonalpyn Downs, South Australia.** *Bull. 269 Aust. Commonw. Sci. Industr. Res. Organ.* 1952, pp. 36, bibl. 67, illus. [CSIRO, Adelaide]

A comparison was made of the performance of over 100 species and varieties of *Pisum*, *Vicia*, *Lathyrus*, and *Lupinus* grown in freshly-cleared Buckingham sand in the Coonalpyn Downs, S. Australia. Cereals grown in the new soil, to prepare it for permanent pasture, had been found to produce very low yields of grain and straw. The investigation aimed to determine whether any of the pulses could be grown successfully. Many of the species tested grew well in the trials, and the results are considered to justify further multiplication and testing of the most promising of them. The Dun variety of field peas produced more than 25 bu. of grain per acre. Several vetches, notably *Vicia articulata*, *V. dasycarpa*, and one variety of *V. ervilia*, and three varieties of *Lathyrus sativus*, produced more seed than commercial golden tares (*V. sativa*), the control. All the species and varieties of *Lupinus* grew poorly. Several characteristics of the pulses are noted and discussed, including rate of development, habit of growth, shattering of mature pods, and variation in average seed size.—From authors' summary.

616 SRINIVASAN, V. and JAYABHIMA RAO, K. **Progress of pulses improvement work in Madras.** *Madras agric. J.* 1952, **39,** No. 9, 478-84. [Agric. Res. Inst., Coimbatore]

Improved strains of the following pulses have been bred : *Cajanus cajan*, *Phaseolus mungo*, *Ph. aureus*, *Dolichos biflorus*, *Cicer arietinum*, *Dolichos lablab* and *Vigna unguiculata*. The new strains are being distributed in Madras.—W.J.B.

617 BROUWER, W. Steigerung der Erträge der Hülsenfrüchte durch Beregnung sowie Fragen der Bodenuntersuchung und Düngung. [**Increasing the yield of leguminous crops by watering, together with questions of soil investigation and manuring.**] *Z. Acker- u. Pflbau* 1949, **91,** No. 3, 319-46, bibl. 14. [Received 1952] [Stuttgart-Hohenheim]

From 1941-4, 6 plots, each of peas, field beans (*Vicia faba*), and vetch (*V. sativa*) growing in shallow, stony loam, received 25 mm. waste water at three 10-day intervals, or 75 mm. in all, the application beginning in the first plot on 10 May, in the second on 20 May, and so on. A full account and discussion of these trials is presented, with special reference to the effect of weather, and rainfall in particular, upon the quantity of soil nutrients available to plants. For seed production, the best time to water peas, field beans and vetch is when they are in flower ; to encourage green-matter or fodder production, watering should begin 2 to 3 weeks before flowering sets in. The application of Ca or K shortly before flowering gave good results with peas.—G.M.R.

ROOTS

SUGAR-BEET

618 LÜDECKE, H. Konnen die Reihenabstände im Zuckerrübenbau genormt werden ? [**Can the row spacing in sugar-beet cultivation be standardized**?] *Mitt. dtsch. landw. Gesellsch.* 1952, **67,** No. 39, 585-7, illus. [Forschstelle Zuckerrübenanbau, Holtensen bei Göttingen, Germany]

Different widths of planting are practised in different parts of Germany. With the introduction of mechanization into farming it is in the interests of farmers to use standard widths of planting. Two widths, 42 cm. and 50 cm., are suggested and the advantages and disadvantages of each are mentioned as they apply to provinces in Germany.—D.B.

619 FLAMINI, B. Spaziamenti e fallanze nella coltura della bietola. [**Spacing and failures in the stand of sugar-beet crops.**] *Industr. saccar. ital.* 1952, **45,** No. 7-8, 253-65, bibl. 9.

The trials described were carried out in 1951 in 2 different environments in the Po Valley, at Agna near Padova and at Mezzano near Ravenna, to study the best plant density for the 3 main sugar-beet types employed in Italy, P, N and Z. The plant densities tested ranged from 3 to 25 plants per sq. m. A supplementary investigation was carried out in the latter locality to study the unfavourable effect on yield of failures in the stand which were produced artificially by uprooting one-third of the seedlings in 4 different ways. The main results from these trials were : (a) bolting was favoured by a low plant density in the type N, more so in Z ; (b) nere was a greater resistance to *Cercospora beticola* af spot at the lower plant densities ; (c) within ertain limits (5 to 15 plants per sq. m.) with all the types, there was a compensation between weight the single roots and number of plants per unit rea, so that the total yield of roots per ha. re- ained approximately constant ; (d) the per- entage of sugar in the root increased as the plant ensity increased ; (e) it was confirmed that the est plant density is 9 to 10 plants per sq. m. ; (f) ontrary to expectation, the decrease in yield aused by failure in the stand was small. [See also *'ld Crop Abstr.* 4 : 1062.]—E.B.O.

20 ČERNĚNKOV, A. D. Podzimní osev cukrové řepy v nečernozemní pblasti. [**Autumn sowing of sugar-beet in the non-chernozem zone.**] *Social. Zeměd.* (*Social. Agric.*) 1952, **26,** No. 8, 884-7. [Czechoslovakia]

21 GIARDINI, A. L'influenza delle sarchiature sulla produzione bieticola. [**The influence of hoeing on sugar-beet yield.**] *Industr. saccar. ital.* 1952, **45,** No. 5-6, 180-5, bibl. 28.
'wo trials on the hoeing of sugar-beet were carried ıt in Italy in 1951, one near Ravenna on clayey- ılcareous soil, the other near Ferrara on soil of ıedium consistency. Rainfall was high during ıe whole vegetative cycle of the crop. Results of ıese trials confirmed those obtained in 1949-50 ee *Fld Crop Abstr.* 5 : 140]. Sugar-beet yields ıdicated that weed control is the most important ffect of hoeing.—E.B.O.

2 CIAFFI, B. La bietola in collina. [**Sugar-beet grown in the hills.**] *G. Agric. Domen.* 1952, **62,** No. 51, 391.
 is possible to grow sugar-beet without irrigation ı the hills of Italy by ploughing with a tractor to a epth of 65-70 cm. In trials carried out in the Iarche region, the average sugar yield obtained by tis method was about 52 q. and the maximum sgar yield 65 q. per ha. The percentage of sugar in te roots varied from 16 to 19.7.—E.B.O.

3 DENMARK. Statens Forsøgsvirksomhed i Plantekultur. Medd. 465. Forsøg med stammer af sukkerroer til fabrik. [**Varietal trials with sugar-beet.**] *Tidsskr. Planteavl* 1952, **55,** 543-5.
I trials at 4 locations in Denmark, 9 Danish, 1 Svedish, 1 German and Hunsballe X sugar-beet fr fodder were compared. The varieties were ıaced in 2 groups, the first containing 6 varieties ıth sugar contents ranging from 16.9 to 17.3%, ıd the second with sugar contents ranging from 1.3 to 16.1 %. In the first group the highest sgar-yield came from Maribo P (17.2% sugar), ıth 81.8 hkg. per ha., followed by Maribo T, .0 hkg., Maribo N, 77.9 hkg. and Klein Wanzleben N, 75.4 hkg. per ha. In the second group, Adefa 17 produced most sugar (15.5%), with 83.2 hkg. per ha., followed by Adefa 45, 75.1 hkg., Glostrup S, 74.9 hkg. and Eagle Hill 651 III, with 74.2 hkg. per ha. Hunsballe X had a sugar content of 14.1%, but produced 82.6 hkg. of sugar per ha. Data show the percentage of bolters in each variety sown at 2 different dates. A description is given of each variety. Maribo P and Maribo T are polyploid types.—P.J.B.

624 DENMARK. Statens Forsøgvirksomhed i Plantekultur. Medd. No. 475. Forsøg med danske og svenske stammer af sukkerroer til fabrik 1950-51. (Foreløbig meddelelse). [**Trials with Danish and Swedish strains of sugar-beet, 1950-51. (Provisional report.)**] *Tidsskr. Planteavl* 1952, **56,** No. 1, 149-50.
Trials were carried out during 1950-1 at 3 locations in Denmark with the Danish sugar-beet varieties Maribo P and Maribo N and the Swedish varieties Hilleshög K and Hilleshög. Sugar yields during 1950 for Maribo N and Hilleshög were 73.1 and, 72.6 hkg. per ha., respectively. In 1951, Maribo P, Hilleshög K, Maribo N and Hilleshög yielded 79.5 75.8, 75.5 and 72.1 hkg. per ha. of sugar, with a sugar content in the roots of 18.5, 18.1, 18.6 and 18.3%, respectively. During 1950-1, Maribo N and Hilleshög yielded 74.3 and 72.3 hkg. per ha. of sugar with a sugar content in the roots of 17.7 and 17.4%, respectively. A brief description is given of each variety. Maribo P is a polyploid type, released to farmers in 1952 : it gave the highest sugar yields in these trials.—P.J.B.

625 BURIÁN, A. Jarovisace a skladování semene řepy cukrové. **The vernalization and storing of sugar-beet seed.** *Sborn. čsl. Akad. Zeměd.* (*Ann.Acad.csl. Agric.*) 1952, **25,** No. 3, 185-98, bibl. 30, illus., Russian and English summaries pp. 197-8.
Experiments with the vernalization of sugar-beet seed have shown that it is necessary, before vernalization proper, to remove the germination inhibitors from the sugar-beet seed. These inhibitors were removed by soaking the seed in cold, running water for 4 hours. It is sufficient to vernalize the sugar-beet seed for 3 days at −2 to +2°C. to obtain the optimal results. It is possible to dry the vernalized seed and to store it for some time without reducing its power of germination. By vernalizing the seed, seedling emergence is accelerated by 3 to 5 days and the power of seed germination is raised by 10 to 20%. By sowing vernalized seed, weed control is easier and the development of the sugar-beet plant is accelerated.—From author's summary.

626 KLOEN, D. Enige opmerkingen over de zaadteelt van bieten. [**Some observations on**

the production of (sugar-)beet seed.] *Landb-Voorl.* 1952, **9,** No. 5, 183-92. [Sticht. Plantenveredel. Wageningen, Netherlands]
Virus yellows, the storage of stecklings, the management and effect of soils on steckling growth, the overwintering of stecklings in the field and the growing of stecklings in cold frames and houses are discussed.—P.J.B.

627 af KLINTEBERG, H. B. Några synpunkter på rotbranden i samband med undersökningar i betfält av fläckar med nedsatt plantutveckling. [**Some observations on black leg of sugar-beet in connexion with investigations of patches on beet fields on which crop growth is poor.**] *Nord. JordbrForskn.* 1952, **34,** No. 2, 144-50.
The results are presented of studies at 2 locations in Sweden on the interrelation between soil nutrient status and black-leg disease in sugar-beet. The results showed that at the location studied, P-deficiency in the soil was the major predisposing factor to the disease and that attacks of the disease could be expected where the P content of the soil was below 2.5 mg. per 100 g. soil.—P.J.B.

628 MURAVĚV, V. A. Vliv zralosti cukrovky na vzdornost kořenů proti hnilobě. [**Effect of degree of ripeness of sugar-beet on resistance of the roots to rotting.**] *Social. Zeměd.* (*Social. Agric.*) 1952, **26,** No. 8, 927-30. [Czechoslovakia]
[From *Saharnaja Promyslennostj* 1952, 26, No. 1, pp. 41-3.]

629† ERNOULD, L. La jaunisse de la betterave. [**Virus yellows of beet.**] *Publ. Vulg. Inst. belge Amélior. Better.* 1952, No. 1, 3-11. [Inst. Better., Tirlemont, Belgium]

630 COONS, G. H. **Virus yellows of beet in the United States.** *Pl. Dis. Reptr* 1952, **36,** No. 9, 356-63, bibl. 5.
From the results of serological and other tests, evidence is presented to show that virus yellows is present in the USA in Michigan, Colorado, Utah, Oregon and California. From 3 years' observations, it was apparent that the disease appears late in the season in Michigan, Colorado and Utah and is localized to sources of infection such as sugar-beet breeding stations. In California and Oregon, however, continuous infection of crops takes place from seed crops and overlapping commercial crops and as a result of proximity to garden beet or spinach crops. In the view of European specialists, virus yellows in the USA is of a relatively mild type.—P.J.B.

631 RIETBERG, H. De vergelingsziekte der bieten. II. Aanvullende opmerkingen bij het verslag over 1940-1948. [**Virus yellows of sugar-beet. II. Supplementary notes to the report for the period 1940-8.**] *Meded. Inst. rat. Suikerprod.* 1952, **21,** No. 3, 277-91, English and French summaries pp. 288-9.
The geographical distribution of virus yellows is briefly outlined. The symptoms of the disease as recorded in the Netherlands are described and the changes in the chemical composition of the leaf caused by the virus are mentioned. Both serological and chemical investigations have demonstrated the distinct nature of the 2 virus diseases, virus yellows and 41 yellows. In mild winters, annual weeds of the Chenopodiaceae are now known to overwinter and to serve as sources of virus infection. Winter spinach is another source of infection. It is now clear that the incidence of virus yellows in the seed-beet areas of Groningen is far higher than was suggested in the report of 1948. The use of serological diagnosis has now been extended to field-work in order to distinguish virus yellows from other diseases in which yellowing of the leaf takes place.—W.J.B.

632 HARTSUIJKER, K. De vergelingsziekte der bieten. I. Samenvattend verslag van het onderzoek in de jaren 1940-1948. [**Beet yellows. I. Summarized report of research during the years 1940-8.**] *Meded. Inst. rat. Suikerprod.* 1951, **21,** No. 15, 17-275, bibl. 210, illus., English summary pp. 243-50.
This publication constitutes a valuable summary of research in the Netherlands on virus yellows in beet crops. It is divided into 11 sections. The first two review the history of the disease and its geographical distribution. The next 8 sections deal in order, with : the symptoms of virus yellows, the characteristics of the virus, its transmission, vectors, the mode of infection by aphids, the development of the virus in crops, the nature of the spread of the disease in the field, and the occurrence of virus yellows in the Netherlands. A final section reviews control measures. Direct control of aphids in the field appears to be impracticable and no practical means had been found by 1948 for controlling aphids overwintering in clamps. Again, no resistance to yellows had been found among different varieties and genetically different species of *Beta*. The only control measures so far found to be of value have been early sowing combined with a high number of plants per unit area. All beet clamps should be removed and residues destroyed by, at latest, 1 April each year in the Netherlands, and the growing of large areas of seed crops should be avoided where possible, except in the Groningen district.—P.J.B.

633 WATSON, D. J. **Plant nutrition. Uptake of nutrients from solutions sprayed on leaves.** *Rep. Rothamst. Exp. Sta. 1951* Harpenden, 1952, 63-5.

Three experiments are reported. In the first, he leaves of sugar-beet were sprayed daily with nutrient N, P and K solutions, either for 8 weeks early in the growth period or during the ubsequent 9 weeks. Early spraying caused a greater increase in final dry-weight and in total nutrient uptake than late spraying, but did not appreciably affect the percentage nutrient content n the dry matter. Later spraying increased the percentage content of N and P. In the second xperiment, various types of nitrogenous manures n foliar sprays were tested as sources of N for ugar-beet. The total N uptake by sugar-beet plants from foliar sprays of ammonium sulphate, alcium nitrate and urea was almost identical for ach compound. Ammonium sulphate increased oot-weight less than calcium nitrate or urea, possibly because it scorched the leaves. In the third xperiment, the influence of a nitrogenous foliar pray on the protein content of sugar-beet tops and oots was investigated. Field plots of sugar-beet were sprayed with 3% ammonium nitrate solution on 6 occasions in 2 periods of 3 weeks at the end of August and in September. Altogether 180 lb. per acre of ammonium nitrate were applied. Sprayng increased the dry weight of leaf lamina by 20%. The percentage protein and N in the dry matter were both increased and the yield of protein in the eaf lamina was increased by 30-50 % depending on the time of spraying. The N content of the oots was increased by 16%. The recovery of N n the whole plant was 80% of that applied in the spray.—W.J.B.

634 VAN GINNEKEN, P. J. H. De minerale samenstelling van loof en wortel van suikerbieten gedurende de groei. [**The mineral composition of tops and root of sugar-beet during the growth period.**] *Meded. Inst. rat. Suikerprod.* 1952, **22,** No. 45, 1-162, illus., English and French summaries pp. 153-62.

The composition of the tops and roots of sugarbeet during the growth period is studied with special reference to the content of N, P, K, Na, Mg, Ca and sugar. The relationship between the quantity of each element present in the top and in the root to the top-weight and root-weight, respectively, is described and illustrated by graphs. The significance of variations in the quantities of sugar and of the elements Mg, Ca, K and Na in the plant at different stages of growth is discussed at length.—W.J.B.

635 MIKKELSEN, D. S. and others. **Sugar beet response to maleic hydrazide treatment.** *Agron. J.* 1952, **44,** No. 10, 533-6, bibl. 10. [Calif. Agric. Exp. Sta., Davis]

In order to find a means of limiting the excessive vegetative growth and consequent low sugar content of sugar-beet grown on highly fertile organic soils in California, trials were laid down on plots of highly fertile soil, with water supplied by subirrigation and sprinkler irrigation. The sugar-beet was treated on 8 July, 1950, when the crop was 112 days old, with 0.2, 0.4 and 0.8% aqueous solutions of maleic hydrazide, to give rates of application of 0.75, 1.5 and 3 lb. of maleic hydrazide, respectively, per ac., the plots being harvested at 30 and 44 days after treatment. In similar trials in 1951, the crop was treated 150 days after sowing with 0.3% maleic hydrazide solutions to give a rate of application of 1.13 lb. per ac. The plots were harvested 21, 42 and 63 days after treatment. The 1951 trials were conducted on a highly organic soil and 80 lb. N per ac. were applied at the time of sowing. In the 1950 trials, the vegetative growth of leaves was reduced in proportion to the amount of maleic hydrazide applied, while root growth was not affected. At the first harvest date, 30 days after treatment, the root weights of plants receiving 0.2% concentrations of maleic hydrazide were considerably above those from untreated controls, or of plants receiving 0.4 and 0.8% concentrations. At 44 days after treatment, the root weights of all plants treated were significantly higher than those of untreated controls, though there were no significant differences between the different maleic hydrazide applications in this respect. In the 1950 and 1951 trials, maleic hydrazide in all cases increased the sugar content of roots, as compared with controls, the highest increases being 1.05% in 1950 and 2.18% in 1951. In the 1950 trials, optimum applications of maleic hydrazide increased sugar yields by 30.5 and 29.4 %, compared with controls, where the harvest followed at 30 and 44 days after treatment, respectively. In the 1951 trials, maleic hydrazide increased sugar yields by 6.2 % within 21 days of treatment, compared with controls. Possible modes of action of maleic hydrazide are discussed.—P.J.B.

636 PETERSEN, P. Sklízení řepy cukrovky kombajnem. [**Combine harvesting of sugar-beet.**] *Social. Zeměd.* (*Social. Agric.*) 1952, **26,** No. 8, 890-9. [Czechoslovakia]

637 CARBONI, G. Conservazione delle bietole in sili interrati a carico e scarico automatici. [**The storage of sugar-beet in silos built into the soil using automatic loading and unloading.**] *Industr. saccar. ital.* 1952, **45,** No. 7-8, 287-91, bibl. 3.

Results of 3 years' trials in Italy have shown that both weight loss and sugar loss in stored sugarbeet are smaller in silos built into the soil than in open silos. In the new type of silo described, automatic loading and unloading would reduce these losses still further.—E.B.O.

FODDER-BEET

638 GREAT BRITAIN. Ministry of Agriculture and Fisheries. Adv. Leafl. 405. **Fodder beet: cultivation.** 1952, pp. 5.

Notes are given on fodder-beet nomenclature in Britain, types and varieties grown, cultivation, yields, harvesting and storage.—P.J.B.

639 DENMARK. Statens Forsøgsvirksomhed i Plantekultur. Medd. No. 471. Forsøg med forskellig optagningstid for foderbeder og kålroer. [**Trials on different harvest dates for fodder-beet and swedes.**] *Tidsskr. Planteavl* 1952, **56,** No. 1, 137-40.

Trials were carried out at 4 locations on clay loam, and one on sandy loam, in Denmark to determine the dry-matter yield of roots and the yield of fresh, sand-free tops of mangolds, fodder-beet and swedes harvested at different times. In the trials with beet crops, during 1945-8, Barres mangolds and Pajbjerg Rex IX fodder sugar-beet were used. With mangolds, harvest dates were 1, 16 and 31 October and mean dry-matter yields of roots were 86.1, 91.8 and 93.5 hkg. per ha. and of tops 22, 19.3 and 15.5 hkg. per ha., for each harvest date, respectively. The percentage of withered tops rose from 14 to 27% and the dry-matter content of the roots rose from 13.8 to 14.2 and that of the tops from 10.9 to 12.2% from 1 to 31 October. With fodder sugar-beet, harvest dates were 1, 16 and 31 October and 15 November. The dry-matter yield of roots was 93.1, 98.9, 105.1 and 107.4 hkg. per ha. and that of tops 27.6, 26.1, 22.5, and 16.9 hkg. per ha. for each harvest date, respectively. The percentage of withered tops rose from 13 to 33% and the percentage of sand in the dry matter of the tops from 6.6 to 10.9% between the first and last harvest dates. With mangolds the combined dry-matter yields of roots + 75% of the tops was highest at harvest in mid-October and with fodder sugar-beet, in late October. With swedes, the trials were carried out at 3 locations on clay loam, and at 3 on sandy loam, during 1947-50. Bangholm and Wilhelmsburger varieties were used. Harvest dates were 16 October and 1 and 15 November. With Bangholm (Wilby Øtofte IX), the dry-matter yield of roots averaged 78.8, 79.5 and 80.4 hkg. per ha. and that of tops, 11.5, 10.2 and 9.1 hkg. per ha., respectively, for the 3 harvest dates. With Wilhelmsburger (Øtofte IX and D.), the dry-matter yield of roots was 75.5, 75.5 and 75.9 hkg. per ha. and that of tops 8.8, 7.4 and 6.9 hkg. per ha., respectively. From these results, it was concluded that swedes in Denmark should be harvested in late October, or early November.—P.J.B.

640 CASTLE, M. E. and others. **Fodder beet. Pt. II. A further comparison of Danish fodder-beet and English mangold in the South of England, 1950 and 1951.** *Emp. J. exp. Agric.* 1952, **20,** No. 80, 316-25, bibl. 13. [Nat. Inst. Res. Dairy., Univ. Reading]

[See also *Herb. Abstr.* 22 : 1170.] Details are given of field trials carried out in 1950 and 1951 comparing two varieties of Danish fodder-beet and one variety of Danish mangold with English Yellow Globe mangold, each at two levels of nitrogenous manuring. The average yields in tons/acre of the cleaned roots were : Pajbjerg Rex X, 18.9 and 15.1 ; Red Øtofte X, 23.4 and 16.0 ; Barres Øtofte X, 27.3 and 18.6 ; and Yellow Globe, 34.8 and 21.5, in 1950 and 1951, respectively. The average percentage of dry matter in the roots was Pajbjerg Rex X, 20.6 ; Red Øtofte X, 18.7 ; Barres Øtofte X, 14.9 ; and Yellow Globe, 10.9 %. The results from the 1950 and 1951 trials agree in general with those of 1948 and 1949 ; over the 4 years the fodder-beet Pajbjerg Rex produced 3.49 tons of root dry-matter per acre and the mangold Yellow Globe 2.90 tons. The heavy nitrogenous top-dressing increased the output of dry matter from both beet and mangolds. The largest responses were from the root of the mangold and the tops of fodder-beet. The advantages of fodder-beet, as compared with mangold, based on the 4 years' results, are discussed.—From authors' summary.

POTATO

641 NEMČIN, F. I. [**The influence of the time of summer planting on the yield of potatoes.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 8, 60-2. [Tiraspoljskaja Exp. Sta.]

To obtain from summer plantings large crops of healthy, high-yielding seed potatoes, planting of early varieties (Kurjer, Oktjabrenok, etc.) should be carried out in Moldavia at the following dates : in the northern regions, in seed plots from 5 to 10 July ; in the central regions, in ordinary plots from 10 to 15 July and in seed plots from 15 to 20 July ; in the southern regions, in ordinary plots from 10 to 15 July and in seed plots from 20 to 25 July ; Medium-early varieties (Jubelj, Berlihingen, Karnea, Lihtblik, etc.) should be planted from 8 to 10 days earlier than Kurjer. On unirrigated plots, particularly in dry weather, summer planting should be done during the first few days, but in wet weather and on irrigated plots during the last few days of the periods specified above. In some regions, as a result of planting too early in the summer, Kurjer shows serious degeneration after 3 to 4 years and gives low yields ; a change of seed is then necessary.—R.P.J.

642 TERRE MAROCAINE. Compte-rendu des résultats de deux essais comparatifs de divers écartements pour les cultures de pommes de

terre de saison (Campagne 1950-1951). [**Report of the results from two comparative trials on different spacings for spring- and autumn-grown potato crops (1950-1 season).**] *Terre maroc.* 1952, **26,** Nos. 274 and 275, 334-41, and 386-92, bibl. 6, illus.

These trials were carried out in the Fez-Meknes region, Morocco, with 3 potato varieties of different vegetative development, Ackersegen, Étoile du Léon and Royal Kidney, each grown at the following spacings in cm.: 70 × 40, 100 × 35 and 80 × 45. One trial was carried out in spring and another in autumn. As the results from the autumn trial confirmed as a whole those obtained from the spring trial, the following general conclusions were drawn: (a) the vegetative development of the 3 varieties was good at each of the spacings tested; (b) the spacing 80 × 45 gave the highest yields per plant (this advantage was significant for all the 3 varieties in the spring trial but for Ackersegen only in the autumn trial); (c) the spacing 70 × 40 gave the highest yields per unit area and a low percentage of small tubers. It is considered that about 80 cm. is the highest safe spacing between the rows, and 35 cm. the lowest safe spacing between setts in the rows.—E.B.O.

643 De Jong, W. H. De teelt van aardappelpootgoed als stoppelgewas. [**The planting of stock seed potatoes in the late summer.**] *Landbouwk. Tijdschr.* 1952, **64,** No. 10, 728-31, bibl. 1.

Trials were carried out on soils of varying type in the Netherlands to determine whether the incidence of aphis-borne virus diseases in seed potatoes could be reduced by planting stock seed potatoes late in the summer (August) and harvesting the crop of seed-potatoes in the following October or November. Experiments carried out in 1949-52 demonstrated that stock seed potatoes stored at a temperature of 2°C., carefully sprouted and sown late in August will yield a crop of seed potatoes in which virus infection is less than in seed potatoes harvested from stock sown in April.—W.J.B.

644 Singh, M. **The influence of cultural and manurial factors on plant development and yield of the potato.** *Emp. J. exp. Agric.* 1952, **20,** No. 80, 301-15, bibl. 18. [Cent. Potato Res. Inst., Patna, Bihar]

Results of investigations carried out at Boghall, Edinburgh, during 1946-7 on the diverse factors affecting the vegetative development and yield of the potato, showed that sprouts from small seed emerged later, were fewer in number and had slower early development than those from large seed. With decreased seed-size, tuber-number decreased and leaf-weight ratios and net assimilation rates remained higher. The resulting growth raised the tuber-size and the proportion of 'ware' potatoes in the produce. In a wet year large seed out-yielded small seed to the extent of the extra seed-weight planted. In a dry year the small seed produced about as great a gross yield as the large seed. Close spacing acted like large seed on growth and yields. A unit change in spacing, however, produced more effect on yield characters than a unit change in seed size. Deferred planting delayed emergence by one-third to one-half the interval between plantings and raised the sprout-number. Late planting reproduced longer internodes, a slightly higher leaf-weight ratio and greater succulence, but yielded less than the early planting. The superiority of early planting was enhanced by close spacing and nitrogen application. Applications of nitrogenous fertilizer increased leaf-weight ratio, tuber-size, yield and ware proportion but depressed assimilation rate in the mid- and late-season. Nitrogenous fertilizer acted best with early planting, small seed and medium spacing (12 in. between setts). Application of potassium chloride increased extension growth, water content and assimilation rate during drought, but decreased the leaf-number. It also reinforced the effect of nitrogen on growth and yield.—From author's summary.

645 Jähnl, G. Ergebnisse der Kartoffelversuche des Jahres 1951. [**Results of potato trials in 1951.**] *VersErgebn. Bundesanst. alp. Landw., Admont* 1952, No. 15, pp. 27, illus.

For the early- and late-potato varietal trials in Admont, Austria, data are tabulated for yield, starch content, size of potato, observations on the tuber and the development of the whole plant. The time-of-sowing trials indicated that sowing at end of April gave the best yields. Another series of trials investigated sprouting and cutting and the yields obtained under different combinations of various sprouting and cutting treatments. The only statistically significant result was obtained when all the cut tubers were compared with all the uncut ones, yields from the cut tubers being lower than from the uncut ones. When grown at different altitudes the "order of merit" of the several varieties was considerably modified.—D.B.

646 Boock, O. J. A multiplicação de batatinha por meio dos brotos. [**The potato-shoot as a means of multiplying stocks.**] *Bragantia* 1951, **2,** Nos. 1-3, 91-2, illus., English summary p. 92. [Agron. Inst. Campinas, Brazil]

The possibility of raising potato plants from shoots was investigated. Potatoes of the variety Prummel P-299 were stored for 8 months in the dark. 112 shoots with an average length of 13 cm. were then removed from the tubers and planted out 20 cm. apart, in plots which were irrigated daily. All took root. Later they were thinned to 56 plants, 40 cm. apart. After 2 months growth, 336 tubers weighing 4.5 kg. were harvested. A limited stock of potatoes, of a given genetic constitution, could be propagated and rapidly multiplied by this method. —W.J.B.

647 KUNKEL, R. **Results with potato vine killers in Colorado.** *Tech. Bull. 46 Colorado agric. Exp. Sta.* 1952, pp. 36, bibl. 26, illus.

The results are reported of 3-years' trials at the San Luis Valley and at Greeley, Colorado, on the effectiveness of vine killing and the effect on total yield, specific gravity and stem-end discoloration of tubers, of the following methods of killing vines: flaming, vine beating with a rota-beater, undercutting, spraying with Dow 66 (10% DNOSBP, 87% mineral oil), Sinox General (50% DNOSBP + 10% dinitro ortho secondary amyl phenol) and $NaAsO_3$ sprays. Vine killing generally reduced the specific gravity of the tubers, compared with controls, the more immature the vines at the time of killing, the greater the reduction in specific gravity. The skinning of tubers by lifting machinery was reduced by vine killing; the longer the tubers remained after vine killing, the lower the degree of skinning. Irrigation of plots 4 days before vine killing increased tuber yields, decreased the specific gravity of the tubers and reduced the amount of stem-end discoloration, compared with unirrigated plots. The age of the vines was of little importance as a factor determining the amount of stem-end discoloration obtained following vine killing. Of the methods used for killing vines, that using the rotary beater gave the best results of all and is the most commonly used practice in Colorado. The amount of stem-end discoloration caused by this method is small and but little influenced by soil moisture. Where the tubers are lifted shortly after vine killing, skinning can be kept to a minimum. Among the chemical treatments, $NaAsO_3$ gave the best results.—P.J.B.

648 PETERSON, C. E. and GWINN, A. B. **Influence of vine killing and 2,4-D on yield, specific gravity, and vascular discoloration of potatoes.** *Amer. Potato J.* 1952, **29,** No. 11, 253-67, bibl. 30. [Iowa Agric. Exp. Sta., Ames]

Chemical and mechanical haulm-killing and a summer application of 2,4-D were tested in 1949 and 1950 on 4 varieties of potatoes grown in muck soil. In 1949, temperatures were generally above normal with rainfall below normal in August and September; whereas, in 1950, temperatures were below normal and precipitation near or above normal during most of the growing season. Yields and specific gravity were generally higher in 1950 than in 1949, the lower temperatures and higher moisture supply in 1950 acting to the advantage of the late varieties. It is pointed out that potato tubers increase in specific gravity after the haulm has begun to show symptoms of senescence and after yield has ceased to increase appreciably. As the increase in starch content after this stage is, however, small, yield is a more important consideration in determining the best haulm-killing practice. Vascular discoloration was more prevalent in 1949 than it was in 1950. This defect was increased significantly in 1949 by both chemical and mechanical killing, with slightly more discoloration following early compared with late killing. In 1950, haulm killing did not increase the incidence of vascular discoloration. There was a more rapid kill with chemical treatment in 1949 than in 1950. Response to 2,4-D was much more rapid and symptoms of injury to the plants were more severe in 1949 than in 1950. Haulm maturity was hastened 10 to 14 days in the first year, but earlier maturity due to the 2,4-D spray was not noticeable in 1950. Treatment with 2,4-D did not produce any significant increases in specific gravity of tubers. Although with the data available it is difficult to isolate the effects of temperature and soil moisture, it is concluded that a combination of conditions which results in a deficient moisture supply seems to be responsible for at least some of the results obtained. —From authors' summary.

649† DIJKSTRA, H. Bedrijfseconomische aspecten van de teelt van voeraardappelen. [**Economic aspects of the cultivation of stock-feed potatoes.**] *Landbouwk. Tijdschr.* 1952, **64,** No. 8/9, 533-50, bibl. 13, illus.

The complex of economic factors governing the profitability of stock-feed potato-growing in the Netherlands is examined. In general the price-structure in the Netherlands is such that it is profitable to sell a portion of the potato crop for human consumption and to feed potatoes to stock on the farm rather than to sell them as stock-feed. The extension of the area under potatoes for stock-feed is advisable when: (a) potatoes are fed to animals with greater than average efficiency, (b) there is a fall in the cost of labour, in the cost of potato-growing in relation to grain-growing or in the price-level in general.—W.J.B.

650 PRATT, A. J. and others. **Yield, tuber set, and quality of potatoes. Effect of irrigation, date of planting and straw mulch on several varieties in Upstate New York, 1948-1951.** *Bull. 876 Cornell Univ. agric. Exp. Sta.* 1952, pp. 35, illus.

In most cases, irrigation significantly increased tuber yields and was economically profitable. Early sowing resulted in significantly higher yields than did late sowing. The greatest yield variations resulted from differences in location. Sowing in wet soils gave considerably lower yields than did sowing in relatively dry soils. Tuber set varied directly with yields; the higher the yields, the better the uber set. Variety was the most important factor, ollowed by location, influencing the weight of ndividual tubers. The specific gravity of tubers vas affected most by location and variety. The yield of varieties which set relatively few tubers vas less reduced by drought than that of varieties with a relatively high tuber set.—P.J.B.

551 POMME de TERRE FRANÇAISE. Les variétés admises au contrôle. 1952. [**The (potato) varieties certified in 1952 (in France).**] *Pomme de terre fr.* 1952, **15**, No. 157, 2-21.

Information is given as to the origin, characters of the tuber and the plant, earliness, disease resistance, cultural requirements, yield and use of 37 varieties of potato grown in France.—E.B.O.

652 AVANZI, E. Alla ricerca di varietà italiane di patata. Una prima realizzazione. [**The search for Italian varieties of potato. The first achievement.**] *Ital. agric.* 1952, **89**, No. 10, 646-9, bibl. 4, illus. [Ist. Agron., Univ. Pisa]

An account is given of the joint work carried out on potatoes at the above Institute and at the Agric. Exp. Sta. of San Michele all'Adige. The main centres of potato breeding are at Sella di Valsugana, Trentino, at about 1000 m. a.s.l., and in the Apennines, Pistoia Prov., at about 900 m. a.s.l. A description is given of the strain 61-1-4 (Jubel × Tonda di Berlino) named San Michele which is being multiplied in various centres. This variety is early and drought resistant and yields on an average 8 to 12 tubers per plant [weight not given]. Its protein content is high, being about 11% on a dry matter basis.—E.B.O.

653 PETERS, E. H. **The certification of potatoes for seed in Canada.** *Amer. Potato J.* 1952, **29**, No. 4, 85-8, bibl. 1. [Pl. Prot. Div., Sci. Serv., Canad. Dep. Agric., Ottawa]

654 ARCHIMOWITSCH, A. von. Cuatro años de ensayos sobre el problema de obtención de patata de siembra en regadíos de Castilla. [**Four years' trials in producing seed potatoes on irrigated land in Castile (Spain).**] *Bol. Inst. Invest. agron.* 1952, **12**, No. 26, 179-93, bibl. 2, German summary p. 193.

Because of heat and drought during summer, conditions which favour the development of virus diseases, potatoes degenerate quickly in Castile. Seed potatoes in Spain are generally obtained by multiplying imported, selected seed at altitudes over 700 m. in the Burgos, Alava, Palencia, Leon and Lerida Provinces. The author studied the possibility of multiplying the imported seed under irrigation in Castile, in the same areas where the potatoes for consumption are grown. From the first 2 years of the trials it appeared that this can oe achieved by late sowing (beginning of July) and by destroying diseased and stunted plants. Results of 4 years' trials, in which the quality of the seed potatoes obtained was tested, showed that it is possible to produce seed potatoes by multiplying the imported seed for 3 consecutive years. The insect vectors of the virus disease were studied. Rules are laid down for producing healthy seed potatoes under irrigation in Castile.—E.B.O.

655 BENSIN, B. M. **Experiments with colchicine treatment of potatoes in Alaska.** *Amer. Potato J.* 1952, **29**, No. 7, 165-9, bibl. 8, illus. [Alaska Agric. Exp. Sta.]

The results from trials carried out in 1948-9 indicated the possibility of increasing potato yields through treating the seed with colchicine. This treatment retarded the maturity of plants and affected the morphological features of both foliage and tubers. Although the resulting tubers were irregular in shape and of an unmarketable type, the increase in yield obtained is considered of interest in the case of potatoes used for dehydrated feed or for industrial uses.—E.B.O.

656 CASSERES, E. H. and others. **Effect of thiourea on the number of stems, on the tuber set and on the yield of Katahdin, Kennebec and Sebago potatoes.** *Amer. Potato J.* 1952, **29**, No. 4, 89-96, bibl. 4. [Cornell Univ., Ithaca, N.Y.]

The object of the 2 trials described was to study the possibility of producing a larger number of B size potatoes suitable for seed, and of reducing the number of over-size tubers, by thiourea treatment. The seed pieces were dipped in aqueous solutions of thiourea before sowing. The results showed that thiourea was effective in increasing the yield of the smaller size potatoes. In other trials, thiourea treatment increased the number of stems per plant, but did not give larger tuber numbers or better yields. In one case, a 2% dust formulation of thiourea increased the average number of stems from Katahdin seed pieces from 2.16 to 4.0. Thiourea at this concentration did not reduce the stands, but higher concentrations were injurious. From the 1951 and previous trials, it is concluded that thiourea, employed in solutions at concentrations not higher than 3%, may increase the number of stems per plant, but that a long growing-season under optimum conditions appears to be necessary for an increased set and higher yields of tubers of the smaller sizes. Under some conditions, a reduction in total yield has resulted from thiourea treatment.—E.B.O.

657 VASUDEVA, R. S. and AZAD, R. N. **Investigations on potato diseases and production of disease-free seed-potatoes in India.** *Emp. J. exp. Agric.* 1952, **20**, No. 80, 293-300, bibl. 12. [Indian Agric. Res. Inst., New Delhi]

658 AYERS, G. W. **Studies on Verticillium wilt of potatoes.** *Amer. Potato J.* 1952, **29,** No. 9, 201-5. [Pl. Path. Lab., Charlottetown, Prince Edward Island, Canada]

The results are given of trials carried out in 1949-51 to test the varietal resistance of potatoes to Verticillium wilt. The seedling F4328 and the variety Houma proved to be highly resistant, while Irish Cobbler, Sebago, Chippewa, F458 and F426 were susceptible and capable of readily disseminating the disease.—E.B.O.

659 BARIBEAU, B. **Verticillium wilt and seed potato certification.** *Amer. Potato J.* 1952, **29,** No. 7, 157-9. [Pl. Prot. Div., Sci. Serv., Dep. Agric., Ottawa, Canada]

The symptoms and mode of transmission of Verticillium wilt on potato are described. The following are the main recommendations for controlling the disease : (a) plant disease-free tubers and use only certified seed ; (b) avoid infected soil and practice a long rotation where the disease has been encountered ; (c) plant the less susceptible varieties ; (d) carry out clean cultivation to prevent the growth of susceptible weeds, or grow cover crops of cereals, grass or clover ; and (e) eliminate diseased plants and those immediately adjacent.—E.B.O.

660 NEWTON, W. **Effects of the application of fungicides to wounded plant tissues.** *Sci. Agric.* 1952, **32,** No. 12, 659-62, bibl. 4. [Pl. Path. Lab., Saanichton, British Columbia]

Potato setts with cut surfaces were dusted with Arasan, Fermate, Spergon and copper oxide, before being planted in soils infested with *Fusarium* sp. The percentages of rotted setts following the above treatments were 60, 48, 80 and 100, compared with 92% for untreated controls ; in a similar trial where the setts were planted in soil infested with *Fusarium caeruleum* the percentages of rotted setts were 2, 16, 25 and 100, respectively, compared with 80% for controls. In another group of trials, potato-tuber-tissue cylinders were subjected to each of the following treatments : dusted with red copper oxide, hydrated lime, sulphur, Arasan, Fermate and Spergon, immersed for 2 min. in a 1/1000 solution of mercuric chloride, and in a 1/75 solution of Semesan Bel. The cylinders were then maintained in a water-saturated atmosphere for 4 days, before transfer to a dry atmosphere, where their moisture losses were determined over a further 4-day period. Moisture losses were 72, 66, 65, 67, 69, 68, 72 and 71%, respectively, for the treatments in the order given. Moisture losses in untreated controls were 64.6%. From these results, it was concluded that Arasan, Fermate and Spergon were effective in reducing Fusarium rot in cut potato tuber surfaces. Copper oxide, on the other hand, resulted in a higher percentage of rotted tubers than where no treatment was made. From the results of the moisture loss determinations in cut tubers, it was apparent that copper and mercury compounds interfered more with the natural healing of cut tuber surfaces than did Arasan, Spergon and Fermate.—P.J.B.

661 MUNCIE, J. H. **Comparison of certain standard and experimental fungicides in potato late blight control.** *Amer. Potato J.* 1952, **29,** No. 8, 186-91. [Michigan Agric. Exp. Sta.]

Field trials were conducted at Lake City Exp. Sta. in 1951, to compare 14 preparations with regard to their effectiveness in controlling late blight [*Phytophthora infestans*] on Chippewa potatoes. The experimental organic fungicides were : No. 1217 (in slurry form), No. 1124, No. 1189, fungicide C (a combination of No. 1189 with copper), Orthocide 406, manganese ethylene bisdithiocarbamate, No. F1003 and No. F1109. The experimental inorganic material was Cop-O-Zinc. The standard fungicides were : Bordeaux mixture, tribasic copper sulphate, Parzate (powder), Dithane D-14 and zinc sulphate. DDT was added to the fungicides at each application and all the plots were sprayed once during the season for aphid control. Results showed that as regards total yield the increases over control plots sprayed with DDT only, from applications of the preparations No. 1189, Parzate, Orthocide 406, manganese ethylene bisdithiocarbamate, F1003, fungicide C and Cop-O-Zinc, were statistically significant. All the fungicides used, except F1109 and No. 1217, at 5 lb. in 100 gave yields of US No. 1 grade significantly better than the control. The following experimental preparations gave outstanding yields of US No. 1 grade potatoes : F1003, manganese ethylene bisdithiocarbamate, Orthocide 406, Cop-O-Zinc and Parzate. Information is given as to the effect of the preparations on foliage infection and tuber rot. Field trials of spray preparations were also conducted in Houghton, Kalkaska and Menominee counties. Results showed higher average potato yields in the 3 counties from applications of Cop-O-Zinc and Orthocide 406 than from tribasic copper sulphate.—E.B.O.

662 MAI, W. F. and LOWNSBERY, B. F. **Crop rotation in relation to the golden nematode population of the soil.** *Phytopathology* 1952, **42,** No. 7, 345-7, bibl. 7. [Pl. Path. Dep., Cornell Univ., Ithaca, N.Y.]

The results are given of determinations of golden nematode (*Heterodera rostochiensis*) populations in soil on Long Island, following different 3-year rotations of field, herbage and horticultural crops, with potatoes. In all cases, nematode populations were significantly lower following the rotational crops than following continuous potatoes ; there were no significant differences between the rotational crops in their ability to reduce soil nematode populations, though herbage crops caused the greatest reductions. The average reduction in soil nematode populations after 2 years under the different rotational crops was 68%, with a range of 49 to 82%. The application of DD (dichloropropene-dichloropropane) at a rate of 450 lb. per ac. in autumn to plots under continuous potatoes, resulted in a reduction of 96% in the number of immature female nematodes on the roots of potatoes grown during the following season.—P.J.B.

663 VAN DEN BRADE, J. and others. Onderzoek van aardappelvarieteiten en van amerikaanse *Solanum*-soorten in verband met het aardappelcystenaaltje *Heterodera rostochiensis* Wollenweber. [**Studies of the reaction of potato varieties and American *Solanum* species to the potato root eelworm, *Heterodera rostochiensis* Wollenweber.**] *Meded. LandbHogesch., Gent* 1952, **17**, No. 1, 51-60, bibl. 16, English summary p. 59.

The results are given of studies of the susceptibility of some 70 varieties, 90 interspecific hybrids and a number of South American *Solanum* species to potato root eelworm (*Heterodera rostochiensis*). No clear results were obtained, though a number of varieties tested were thought worthy of further study. All the South American species and the interspecific hybrids proved susceptible.—P.J.B.

664 LEAR, B. and others. **Soil fumigation experiments on Long Island, New York, to control golden nematode of potatoes.** *Phytopathology* 1952, **42**, No. 4, 193-6, bibl. 5, illus.

In trials during 1951, single and split applications of DD and Dowfume W-40 (ethylene dibromide) and single applications of dichlorobutene mixture and Dowfume N (40% 1,4-dichloro-2-butene isomer) were made to soil infested with golden nematode (*Heterodera rostochiensis*). Tine injection and plough injection were used, the fumigants being applied 5.5 and 6 in. deep. Treatments were made on 19 August, the split applications being made 11 days later. Determinations of the number of viable nematode cysts were made before treatment and 3 weeks after treatment. In 10 out of 20 different treatments viable cyst numbers were reduced by 90%. At equal applications of 450 lb. per ac., dichlorobutene mixture was the most effective treatment, followed by DD, which was almost as effective. Dowfume W-40, at rates of up to 265 lb. per ac., was relatively ineffective. Dowfume N was similar to DD in effectiveness. A split application of 225 + 450 lb. per ac. DD gave 99.9 % control of viable cysts. Soil temperatures at the time of treatment were 75°F.—P.J.B.

665 BOOCK, O. J. Combate aos nematóides pela aplicaçao de fumigantes no solo. Efeito do D-D e Dowfume W-40 no combate aos nematóides formadores de galhas, em tubérculos de batatinha. [**The control of nematodes by soil-fumigants. The effect of DD and Dowfume W-40 on the root-knot nematode of potatoes.**] *Bragantia* 1951, **2**, Nos. 1-3, 13-18, bibl. 5, illus., English summary p. 18. [Cent. Exp. Sta. Campinas, Brazil]

The effect of the soil fumigants, DD (dichloropropene-dichloropropane) and Dowfume W-40 (ethylene dibromide) on the root-knot nematode of potatoes, (*Meloidogyne* spp.), was determined in an experiment in which potatoes were grown in a nematode-infested plot. The experiments, replicated 4 times, involved the following 4 treatments, (1) an application of N, P and K plus fumigation with Shell DD at the rate of 78 l. per ha.; (2) an application of N, P and K plus fumigation with Dowfume W-40 at the rate of 39 l. per ha.; (3) N, P and K only; (4) no treatment. The fumigants were applied 18 days before planting at a depth of 15 cm. Of the tubers harvested 49% were galled by nematodes in the untreated plots, 20% in the unfumigated manured plots, 1.5% in the manured plots fumigated with DD and none in the manured plots fumigated with Dowfume W-40. Both fumigants thus gave effective control of the root-knot nematode.—W.J.B.

666 KEILBACH, R. [**The larva of *Chrysopa* as a possible agent in exterminating the Colorado beetle.**] *Nachrbl. dtsch. PflSchDienst* 1952, **6**, No. 1, 14, illus. [Zool. Inst. Halle a.S. Germany]

A larva of *Chrysopa vulgaris* was observed sucking the contents of 27 eggs of the Colorado beetle (*Leptinotarsa decemlineata*). The 9 remaining eggs developed into larvae. This chance observation might prove of importance in the fundamental study of the biological control of the Colorado beetle.—D.B.

667 BRADLEY, R. H. E. and others. **Aphid (Homoptera: Aphididae) infestations on Chippewa, Katahdin, and the newly released blight-resistant varieties Canso and Keswick.** *Amer. Potato J.* 1952, **29**, No. 9, 221-4, bibl. 6, illus. [Fld Crop Insect Lab., Fredericton, New Brunswick, Canada]

With the potato varieties Canso and Keswick, the need for fungicidal control in the field is reduced, but the need for insecticidal control still remains. The results of a field experiment conducted in 1951 showed that the aphid control measures which have been used successfully on the varieties Chippewa or Katahdin should also be applied to Canso and Keswick.—E.B.O.

668 FORTI, G. Le virosi della patata. [**The virus diseases of the potato.**] *G. Agric. Domen.* 1953, **63**, No. 2, 13.

Notes are given on methods used in USA and Italy for detecting virus disease in seed potatoes.—E.B.O.

669 Pomme de Terre Française. Les maladies à virus de la pomme de terre. [**The virus diseases of potatoes.**] *Pomme de terre fr.* 1952, **15,** No. 156, 11-15.

In France there are 4 stations specializing in applying the method of serum diagnosis for the control of virus disease in potatoes. A classification is given of potato varieties according to whether they are normally free of, or contaminated by, virus. [See also *Fld Crop Abstr.* 5 : 1212.]—E.B.O.

670 Rich, A. E. **Some suggestions for indexing potato tubers.** *Amer. Potato J.* 1952, **29,** No. 7, 170-2, illus. [Washington Agric. Exp. Sta., Pullman]

Improvements in the use of the tuber indexing method for detecting and eliminating virus diseases of potatoes are described.—E.B.O.

671† Coppenet, M. Carences en manganèse sur d'autres plantes que les céréales en Bretagne. [**Manganese deficiency in plants other than cereals in Brittany.**] *C. R. Acad. Agric. Fr.* 1952, **38,** No. 5, 193-5, bibl. 2.

Potatoes, crimson clover and lucerne were grown on soils known to be deficient in manganese. The potatoes showed marked chlorosis and were retarded in growth, but on adding manganese sulphate to the soil the plants became green again. Crimson clover and lucerne (plants considered to be resistant to manganese deficiency) when grown in this soil also responded to additions of manganese sulphate by changing from yellow green to dark green in colour. When the manganese content of the vegetative parts of a plant is less than 20 ppm. of the dry matter, the plant can be considered to be suffering from manganese deficiency. A healthy plant contains at least 40 to 80 ppm. of manganese in the dry matter.—D.B.

672 Eastwood, T. **The effect of herbicides upon potatoes used for chipping.** *Amer. Potato J.* 1952, **29,** No. 7, 160-4, bibl. 1. [Agron. Dep., Pennsylvania State Coll.]

The use of certain listed herbicides, as a delayed pre-emergence application on Rural Russet potatoes, caused some adverse effects upon both the potato tuber and the processed chips. The specific gravity of the treated tubers was significantly reduced and poor colour and off-flavours were observed in the chips.—E.B.O.

673 Verona, O. and Benvenuti, A. Influenza del sodio sullo sviluppo della patata. [**The influence of sodium on the development of the potato.**] *Ann. Sper. agr.* 1952, **6,** No. 6, 1441-6, bibl. 6, illus., English summary p. 1446. [Ist. Pat. Veg., Univ. Pisa, Italy]

The comparative effect of sodium nitrate and calcium nitrate on potatoes was studied. One group of experimental plots received sodium nitrate and another, calcium nitrate. One half of each group of plots was also treated with K. The potato plants grown in the plots treated with sodium nitrate were of greater development, of a deeper green and yielded more than the plants treated with calcium nitrate. Of the latter plants, those which received no K showed slight symptoms of K deficiency, which were not apparent in the plants treated with sodium nitrate.—E.B.O.

674 Levitt, J. and Todd, G. W. **Metal-protein complexes in the potato.** *Physiol. Plant.* 1952, **5,** No. 3, 419-29, bibl 12. [Bot. Dep., Univ. Missouri, Columbia]

The results are given of studies to determine the distribution of micro-nutrients in the potato and to determine whether there were any differences in the quantity of given micro-nutrients associated with crude proteins in dormant and non-dormant tubers. The proportions of Fe, Cu, and Zn in the crude protein of the tuber were 27, 23 and 26%, while the amounts of each element in the crude protein were 567, 145 and 72 μg. per g., respectively. The amount of Mg in the crude protein was negligible. The amounts given could only be regarded as semi-quantitative, though their relative values are considered as dependable. There were no significant differences in the distribution of these elements between dormant and non-dormant tubers.—P.J.B.

675 Asselbergs, E. A. M. and Francis, F. J. **Studies on the formation of vitamin C in slices of potato tissue.** *Canad. J. Bot.* 1952, **30,** No. 6, 665-73, bibl. 19. [Hort. Dep., Ontario Agric. Coll., Guelph]

676 Engelj, O. S. [**Sensitivity of the tissue of potato tubers to Röntgen rays depending on the physiological condition of the tubers.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci., USSR*) 1952, **85,** No. 2, 437-9, bibl. 13. [Timirjazev Inst. Pl. Physiol. Acad. Sci. USSR]

Sensitivity of the parenchymatous tissue of the potato tuber to irradiation, like that of the meristematic tissues, depends on the physiological condition of the tuber at the time of irradiation. The sensitivity of the tuber is greatest in the period of its growth on the maternal plant ; it then declines and is lowest in the resting period. Following the tuber's emergence from the resting period, sensitivity reaches its maximum during the period of active shoot-growth. It does not remain constant during that period, but declines after a time.—R.P.J.

677 HIGHLANDS, M. E. and others. **Reducing sugar content of Maine-grown potatoes treated with maleic hydrazide.** *Amer. Potato J.* 1952, **29,** No. 9, 225-7, bibl. 6. [Maine Agric. Exp. Sta., Orono]

The possibility of lowering the reducing sugar content in potatoes stored at low temperatures by treatment with maleic hydrazide was investigated. Plots of Kennebec and Katahdin potatoes were treated with maleic hydrazide sprays, applied at the rate of 150 gal./acre at levels of 2500 and 1000 ppm., at intervals of 37, 27 and 20 days prior to harvest. The harvested potatoes were stored at 40°F. for 6 months. The results of analyses showed no significant reduction in the accumulation of reducing sugars in the treated potatoes compared with the untreated controls.—E.B.O.

678 FULTS, J. L. and others. **Nitrate content of Red McClure potatoes unchanged by 2,4-D treatment.** *Amer. Potato J.* 1952, **29,** No. 4, 97-8, bibl. 10. [Agric. Exp. Sta., Colorado Coll., Fort Collins]

It was shown that Red McClure potatoes from plants treated with 2,4-D contained non-toxic quantities of nitrate.—E.B.O.

679 WUENSCHER, C. Über den Einfluss der Düngung auf Leistung und Gesundheit der Kartoffel. [**The effect of manuring on performance and health in the potato.**] *Z. Acker- u. Pflbau* 1952, **94,** No. 4, 377-421, bibl. 85. [Univ. Göttingen Ver. Saatzuchten Ebstorf]

Experiments were conducted from 1949 to 1951, both in the field and in a greenhouse in pots, to determine the effect of various manurial treatments on the performance and reaction to virus and insect attack of the seed potatoes taken from the manured cultures. The early development of the seed potatoes from the field cultures reacted differently to the various treatments, but in the course of growth the differences disappeared, leaving no effect upon final yield. Seed potatoes from the pot cultures, however, when sown in the open retained the manurially conditioned differences throughout the course of their development. From a one-year's trial it was found that heavier applications of fertilizer and of N alone or in a dominant proportion increased the performance of seed potatoes, while heavy applications of chlorine resulted in reduced yield. Nevertheless, it is considered that—except under extreme conditions—the manuring of a potato crop has little effect upon the performance of seed potatoes taken from it, under normal field conditions. Cultural technique must aim at increasing the natural resistance of the potato to disease. Counts of *Myzus persicae* showed that heavy doses or a preponderance of N, as also an increasing proportion of chlorine in fertilizers, create favourable conditions for these virus transmitters, whereas phosphoric acid and potassium sulphate have the reverse effect. Virus attack appears to take a course parallel to that of insect attack in the previous year. The sound condition of plants emanating from K-deficiency plots, in spite of heavy louse infestation in the previous year, is attributed to the early perishing of leaves, which prevents the migration of the virus.—G.M.R.

680 KRUEGER, F. H. Über den Einfluss einseitiger Düngung auf den Kartoffelabbau. [**The influence of one-sided manuring on degeneration in the potato.**] *Z. Acker-u. Pflbau* 1951, **93,** No. 3, 359-85, bibl. 40. [Inst. Pflbau Univ. Göttingen, Germany]

Healthy seed potatoes of Böhm's Medium Early variety were planted in a 75-year-old permanent manurial trial, 8 plots of which were fertilized with N, P, K, NPK, NK, PK, and NP, respectively. The harvest obtained in this manuring year was replanted elsewhere under uniform conditions in successive years up to 1949, and these crops, referred to as the aftergrowth, were studied for vigour, leaf roll, and attack by *Myzodes* [*Myzus*] *persicae*. Among conclusions reached are the following. Vigour in the aftergrowth depends principally on the amount of leaf roll. No difference in starch content was discernible in the aftergrowth of the differently manured plots, nor was yield observed to be influenced by different treatment in the manuring year. On the other hand, yield depends on the amount of leaf roll. The effect of N, as shown in the NPK and NK plots, is to enhance liability to infection by the leaf-roll virus. N was also found to produce a foliage development favourable for the insect vectors of the virus and thereby to govern greater infestation. On all the K plots the effect of 40% potassium salt was to enhance susceptibility to infection by the virus. When applied alone, however, this fertilizer results in less infestation by aphids. Extreme deficiency of K can have a salutary effect in producing the early dying of large masses of foliage. Counts of the insect vectors of leaf roll showed that the degree of infestation varies according to potato variety, that it is greater in leaf-roll-diseased plants than in healthy ones, and that *Doralis rhamni* is less sensitive to temperature than is *Myzodes persicae*.—G.M.R.

681 KLAPP, E. Zusammenhang düngungs-und bodenbedingter Standortsunterschiede mit Pfirsichblattlausbesatz und Nachbauwert der Kartoffel. [**Connexion of manurial and soil-conditioned differences of habitat with *Myzodes persicae* infestation of the potato and its value as seed.**] *Z. Acker- u. Pflbau* 1951, **93,** No. 3, 347-58, bibl. 12. [Inst. Boden- u. Pflbaulehre, Univ. Bonn]

In a 45-year-old permanent manurial trial in which different K fertilizers and K deficiency play a part, K deficiency produced the best seed potatoes, followed by potassium sulphate and then by ordinary kainit. Two years' counts of *Myzodes* [*Myzus*] *persicae*, the transmitter of virus, showed infestation to be greatest under deficiency of K. It is probable that this heavy infestation fails to result in heavy virus infection because under K deficiency the plants die several weeks earlier than plants treated with K. However, even when there is no virus present, K-deficient tubers are doubtless undesirable. The part played by secondary components of potassium salts in affecting the physiology of the plant, and thereby insect attack and virus infection, is discussed. In a permanent trial in which heavy applications of farmyard manure, lime, sand and peat were combined with different forms of commercial fertilizer, there was on the whole a degeneration in the plant value in proportion as the amount of fertilizers was increased. The proportion of virus-attacked plants in the aftergrowth followed approximately the same direction. Infestation by *M. persicae*, however, in some extreme combinations decreased with increasing application of fertilizers. In the sanded plot which received no fertilizer and which had always produced above the average seed potatoes, and a smaller than average proportion of diseased plants, *M. persicae* infestation was 5 to 12 times that of the mean infestation recorded. Here again the fact that the plants die early, so that the virus is prevented from migrating further, is probably the cause of the low degree of virus infection. In the permanent trial, of the contrasting treatments tested, (A) close planting with application of P only (both of which accelerate ripening) and (B) wide planting with application of NK (both of which delay ripening), the close planting gave a 24% better performance in the seed potato crop and a considerably smaller proportion of virus-attacked plants. Infestation by *M. persicae* varied in different years: in 1943 (A) was twice as much infested as (B); in 1950 (B) was 5 times as heavily infested as (A). In (A) the plants ripen and die much earlier than in (B), which probably limits the migration of the virus in spite of heavy attack by *M. persicae*. Conclusions drawn are that (1) in growing seed potatoes preference should still be given to the use of potassium; (2) there is not always a simple correlation between attack by *M. persicae* and disease in the subsequent crops, for obviously it can be affected by nutritional differences; and (3) marked deficiency of K on the one hand and excess of chlorine and sodium on the other govern, even in the first year, symptoms which closely resemble those of virus diseases.—G.M.R.

682 CRIJNS, A. H. De teelt van voederaardappelen. [**The cultivation of stock-feed potatoes.**] *Landbouwk. Tijdschr.* 1952, **64,** No. 8/9, 524-32.

The cultivation of potatoes for pig feed on the sandy soils of Brabant has been encouraged by the formation of: (a) machinery co-operatives which provide members with cultivating implements and also with potato steam-cookers, (b) associations of farmers who grow their own seed potatoes at a cost well below the market-price. (Officially sponsored courses of instruction in seed potato growing and selection are provided for members of the associations.) The breeding of new varieties of stock-feed potato suitable for sandy land would further encourage growers. At present, Voran, a late-maturing variety, gives the best results on sandy soils.—W.J.B.

683 KLINKOWSKI, M. Verfahren der Kartoffellagerung im baltischen Raum. [**Potato storage methods in the Baltic region.**] *Z. Acker- u. Pflbau* 1950, **92,** No. 1, 56-70, illus. [Received 1952]

An exposition is given of different methods of constructing potato clamps and storage cellars, designed to withstand conditions of severe cold in Esthonia, Latvia and Lithuania, with notes on their various advantages and disadvantages.—G.M.R.

684 PLATZER, S. Die " Wulfsoder Grabenmiete D. P.", eine neuartige Kartoffeleinmietung. [**The " Wulfsoder pit clamp " (German patent), a new type of potato clamp.**] *Mitt. dtsch. Landw.-Gesellsch.* 1952, **67,** No. 38, 673, illus.

On the Wulfsoder Estate a potato clamp has been built which is a compromise between the old type of pit clamp and the more expensive warehouse type. The approximate dimensions are: length 20 m., width 3 m., depth 1 m. The base is of concrete and the side walls are built of half-brick reinforced with concrete. The upper third of the side walls is of perforated bricks and constitutes part of the ventilation system. A long air canal passes down the centre of the clamp and is left open at the ends. The ends of the clamp are packed with a layer of straw 1 m. thick and the top is well covered with straw. The ridge is covered with shavings only in heavy frost. The air canals are closed only when the thermometer, which records the temperature within the clamp, indicates that this is necessary. 17,000 dz. of potatoes were stored in this clamp in 1951/52. The clamp can also be used for storing mangolds and turnips.—D.B.

685 LUTZ, J. M. and others. **Reducing injuries in grading stored potatoes.** *Amer. Potato J.* 1952, **29,** No. 10, 234-40, bibl. 5, illus.

The following methods were effective in reducing bruising of potatoes during grading: (a) padding graders with sponge rubber, (b) reducing drop in filling sack, (c) pre-warming potatoes to approximately 56°F. The last method is recommended only when bruising cannot be checked by the first 2 methods and by careful handling. It was observed that new injuries were less prevalent late in the shipping season after the potatoes had started to sprout.—E.B.O.

686 Ellison, J. H. **Inhibition of potato sprouting by 2, 3, 5, 6-tetrachloronitrobenzene and methyl ester of α-naphthaleneacetic acid.** *Amer. Potato J.* 1952, **29**, No. 8, 176-81, bibl. 8, illus. [Cornell Univ., Ithaca, N.Y.]

It was found that 2, 3, 5, 6-tetrachloronitrobenzene (TCNB) was an excellent inhibitor of sprouting when used in bins of 10- or 25-bu. capacity, but it was a poor sprout inhibitor when used on lots of 10 or 12 potato tubers. TCNB was ineffective when treated tubers were exposed to free air circulation, as demonstrated by the excessive sprouting of tubers at the surface of treated bins. The methyl ester of α-naphthaleneacetic acid (MENA) proved to be a good sprout inhibitor when used in either small or large lots of potatoes.—From author's summary.

687 Marth, P. C. and Schultz, E. S. **A new sprout inhibitor for potato tubers.** *Amer. Potato J.* 1952, **29**, No. 11, 268-72, bibl. 6, illus. [Bur. Pl. Industr., US Dep. Agric., Beltsville, Md]

In the trials described, 3-Cl-IPC proved to be a potent sprout inhibitor when applied to stored potato tubers. The conditions under which this chemical was applied strongly influenced its inhibiting power. The effective treatment with 3-Cl-IPC was a water dip containing 1% of the chemical. Only 0.5% of 3-Cl-IPC was required when the tubers were stored at low temperatures (40-50°F.) for about a month prior to storage at room temperatures (70-75°F.). At a lower concentration (0.25%) it was effective only when the treated tubers were sealed in paper bags and stored for about one month or longer at low temperatures before they were placed in a warm room. Under the prevailing climatic conditions in Maine, where the average summer temperatures are somewhat lower than at Beltsville, 3-Cl-IPC effectively controlled sprouting in cull piles. Although this chemical apparently evaporates from a treated surface rather readily at ordinary room temperature, 3-Cl-IPC or IPC are not recommended for use on potatoes for food, as information on the effect of small quantities of these 2 chemicals on animals and humans is lacking.—From authors' summary.

688 Paterson, D. R. **The effect of preharvest foliar sprays of maleic hydrazide on sprout inhibition and storage quality of potatoes.** *Pl. Physiol.* 1952, **27**, No. 1, 135-42, bibl. 21, illus. [Michigan State College, East Lansing]

Sprays of 500, 1000, and 2500 ppm. of maleic hydrazide applied to the foliage of Irish Cobbler and Pontiac potato vines approximately 1 to 7 weeks prior to harvest were effective in prolonging dormancy of tubers held in storage for 7 months at temperatures of 45 and 55°F. The inhibition of sprouting resulting from single pre-harvest foliar sprays of 2500 ppm. of maleic hydrazide applied 4 to 7 weeks before harvest was more complete than that obtained with pre-harvest foliar treatments of 2,4,5-T or post-harvest applications of the methyl ester of α-naphthaleneacetic acid. Sprout inhibition induced by maleic hydrazide treatments was accompanied by an absence of shrivelling with little or no deterioration of quality and no reduction of yield in the case of U.S. No. 1 potatoes. Apical dominance of both tubers and individual sprouts on the tubers was destroyed. The possible significance of maleic hydrazide in controlling the degradation of starch to sugar in the storage of potatoes at low temperatures and the inhibition of sprouting at high temperatures is discussed.—From author's summary.

689 Greenwood, Mary L. and others. **The relationship of the specific gravity of six varieties of potatoes to their mealiness as assessed by sensory methods.** *Amer. Potato J.* 1952, **29**, No. 8, 192-6, bibl. 8. [Storrs Agric. Exp. Sta., Connecticut Univ.]

The relationship between specific gravity and mealiness of potatoes was investigated in the varieties Green Mountain, Mohawk, Kennebec, Ontario, Katahdin and Chippewa grown on each of 2 farms. As some discrepancies to this relationship were noted, it was concluded that specific gravity cannot safely be used as the sole criterion in assessing the mealiness of potatoes.—E.B.O.

690 Pearsall, L. W. **Facts about potato quality [in Canada].** *Amer. Potato J.* 1952, **29**, No. 8, 182-5. [Market. Serv., Dep. Agric., Ottawa, Canada]

SWEET POTATO

691 Michael, R. and Smith, P. G. **Stimulation of sweet potato sprout production.** *Proc. Amer. Soc. hort. Sci.* 1952, **59**, 414-20, bibl. 7, illus. [Univ. Calif., Davis]

In trials with 8 varieties of sweet potato, the tubers were harvested during the first week in October and then cured for 10 days at a temperature of 85°F. and stored for different periods at 60°F. The tubers were then treated with different materials to reduce apical dominance and induce sprouting. The treatments used were : momentary dip into solutions of either the Na salt of 2,4-D or the Na salt of 2,4,5-T, each at concentrations of 10 and 20 ppm. ; exposure in a sealed container to ethylene chlorhydrin vapour at a dosage of either 20 ml. or 40 ml. per 100 lb. roots ; exposure to temperatures of 110 and 115°F., for 6, 12, or 18 hr. ; immersing the tubers for 3 hr. in a 3% solution of thiourea ; immersing the tubers for 3 hr. in an acetylene solution made by adding 8 oz. of CaC_2 to 11 gal. water. Of the treatments used, ethylene chlorhydrin appeared to be the most promising for inducing shoot formation. Acetylene and thiourea stimulated shoot production, but caused tuber breakdown. Dip treatments with 2,4-D and 2,4,5-T produced only limited sprout stimulation and resulted in considerable damage to the sprouts in certain cases. Heat treatment stimulated sprout production, but was regarded as of little practical value. There were marked varietal differences in response to the treatments, which were most effective when used on varieties with a low natural capacity for producing sprouts ; varieties with a high natural capacity for sprout production were relatively unaffected by the treatments.—P.J.B.

692 POOLE, W. D. and HERNANDEZ, T. P. **A progress report on weed control in mechanized production of sweet potatoes.** *Proc. 5th Southern Weed Conf., 1952* 1952, 162-5, bibl. 1. [La. Agric. Exp. Sta., Baton Rouge]

In trials in Louisiana, small, whole sweet potatoes were sown on 30 March. Thirteen days later the following herbicidal treatments were given in spray-bands 18 in. wide along the rows : (a) 20 gal. per ac. Diesel fuel plus DNOSBP (Sinox General) at 4 lb. per ac., (b) 6 lb. per ac. water-soluble dinitro (Dow Premerge) and (c) 1.5 lb. per ac. 2,4-D. The first cultivation was done on 10 May, but the treated bands were not disturbed. All treatments gave excellent control of both crabgrass (*Digitaria* spp.) and broad-leaved weeds, the best weed control being given by the Premerge treatment. Highest tuber yields, but second best weed control, followed treatment with (a), the treated plots outyielding hoed control plots by 5 bu. per ac. Only the 2,4-D treatment appeared to injure the plants slightly. In further trials, a comparison was made between treatment with 4 and 8 lb. per ac. Premerge and 0.5 and 1 lb. per ac. CMU as pre-emergence weed-control treatments with hand-planted and machine-planted vine cuttings. The cuttings were planted 8 days after the herbicide treatment. In all cases, Premerge gave better weed control than CMU ; the opening shoe of the mechanical planter, by disturbing the soil, resulted in poorer weed control than hand planting. In all cases, tuber yields were highest following the machine planting. It was considered that the soil disturbance caused by machine planting prevented contact between the plant roots and the herbicide, which was not the case with hand-planted cuttings. It is concluded that pre-planting herbicidal sprays show promise of becoming an economical method for controlling weeds in sweet potatoes.—P.J.B.

693 SHIBUYA, M. **Studies of the varietal resistance of sweet potato to the root-knot nematode injury.** *Mem. Fac. Agric., Kagoshima* 1952, **1,** 1-22, bibl. 19, illus.

Japanese varieties of the sweet potato (*Ipomoea batatas*) are grouped, according to their field-resistance to injury by the root-knot nematode (*Heterodera marioni*), in 3 categories : resistant, less resistant and susceptible. Laboratory experiments showed that larvae of *H. marioni* entered the roots of all varieties, resistant and susceptible, without distinction. Thus the assumption that the nematode was able to select a susceptible in preference to a resistant host was shown to be invalid. A second series of trials showed that once the nematode had entered the root of the sweet potato its further development from the first larval to the adult stage was unhindered in susceptible varieties but was inhibited in resistant varieties. The resistance of the sweet potato to *H. marioni* depends therefore upon a factor which only begins to operate after the entrance of the larvae into the root.—W.J.B.

694 HUGHES, M. B. and AYCOCK, R. **Sweet potato clones resistant to internal cork.** *Proc. Amer. Soc. hort. Sci.* 1952, **59,** 433-8, bibl. 10. [Edisto Exp. Sta., Clemson Coll., Blackville, S. Carolina]

The results are given of trials to determine the resistance to corky spotting of 8 sweet-potato clones, following core-graft inoculation of the tubers from which the clones were originally propagated and inoculation of the plants by natural insect vectors. Six clones had no corky spotting, or very little. Tubers of the Porto Rico variety developed severe symptoms of the disease. From these results it is thought that the disease can be controlled by breeding.—P.J.B.

695 SCOTT, L. E. and OGLE, W. L. **The mineral uptake by the sweet potato.** *Bett. Crops* 1952, **36,** No. 8, 12-16 and 50, bibl. 12. [Univ. Maryland, College Park]

Studies were made of the growth of haulm and root and the chemical composition of sweet potatoes grown in Maryland during 1950. Planting was carried out on 30 May and 1500 lb. per ac. of a 3-9-12 (NPK) manure applied, half on 23 June and the remainder on 11 July. Plant samples were taken at 6 growth stages at 2-week intervals from 15 July to 10 October. During the first 6 weeks of the 16-week growing season, under 10% of the final

otal dry-matter yield had accumulated. During
eptember, the last month of the growing season,
0% of the total final dry-matter yield was pro-
luced, considerably more than half of which, dur-
ng this period, was in the form of root production.
he total uptake of K was about twice that of N and
nd about 5 times that of P. At harvest, about half
he total uptake of N, K and Mg was in the roots
nd about 30% of the P and 80% of the Ca was
ound in the haulm. From these studies, it was con-
luded that sweet potatoes had a high requirement
or K, but a very low P requirement. Though 75%
f the total dry-matter yield was produced during
he second half of the 16-week growing season,
xcept in the case of P, the uptake of all the ele-
nents studied during both halves of the growing
eason was approximately equal.—P.J.B.

96 LANDRAU, P. and SAMUELS, G. **The effect of fertilizers on the yield and quality of sweet-potatoes.** *J. Agric. Univ. Puerto Rico* 1951, **35,** No. 2, 71-87, bibl. 11. [Received 1952]

rials were carried out on 3 different soil-types in
uerto Rico, including, (a) a well-drained, coastal
owland, loamy-sand soil, (b) a coastal plain, sandy-
lay loam and (c) acid-lateritic clay, to determine
he N, P, K, Cu, B, Mn, Mg and Ca requirements of
weet potatoes. The use of 82 lb. per ac. N was the
ost efficient in raising yields; applications of
ver 82 lb. per ac. tended to reduce yields. Amounts
f up to 200 lb. per ac. P_2O_5 had no effect on yields,
xcept on the acid lateritic clay, on which applica-
ions of up to 300 lb. per ac. P_2O_5 resulted in yield
creases. No consistent yield increases followed K
pplications, though K tended to improve tuber
uality. Ca treatment raised yields on the lateritic
lay. No consistent effect was noted following Mg
reatment. The use of B significantly increased
ields on the lateritic clay and on the sandy-clay
oam soil. Mn and Cu had no effect on yields. The
se of N and P increased the carotene content of
he tubers in cases where N and P also increased
uber yields. On the acid lateritic clay (pH 4.5),
here Ca increased tuber yields it also increased the
arotene content of the tubers. K, B, Mg, Mn and
u had no effect on carotene content.—P.J.B.

97 EZELL, B. D. and WILCOX, Marguerite S. **Influence of storage temperature on carotene, total carotenoids and ascorbic acid content of sweet potatoes.** *Pl. Physiol.* 1952, **27,** No. 1, 18-94, bibl. 28, illus. [U.S. Dep. Agric. Beltsville, Md]

he roots of 4 varieties of sweet potato were
nalyzed for carotene, total carotenoids, ascorbic
cid and moisture at harvest, after curing at 85°F.,
nd at intervals during storage at constant tem-
eratures of 50, 55, 60 and 70°F. From the results
is evident that both variety and temperature
lay an important part in carotenoid changes during storage. The best temperature for storage was 60°F., at which temperature there was a post-harvest increase in carotenoids in 3 out of the 4 varieties studied. At 55°F., hitherto regarded as the normal temperature for storage, there was little change in the carotenoid content and at 50°F., there was a significant post-harvest decrease in carotenoids. " The ascorbic acid content of sweet potatoes was not greatly affected by storage temperatures, the tendency in general being for it to decrease fairly rapidly during the first 2 - 3 months in storage and to approach a common level before the storage season was over. The average ascorbic acid content after 2 to 3 months in storage was about one-half to two-thirds that at harvest. The temperature of storage had little effect on the moisture content of sweet potatoes. When held at 85% relative humidity losses in weight were least at 60°F., slightly greater at 55°F., and still greater at 50 and 70°F."—D.B.

698 SIMONS, H. M. and SCOTT, L. E. **Attempts to inhibit sprouting of the sweet potato with growth regulating chemicals.** *Proc. Amer. Soc. hort. Sci.* 1952, **59,** 426-32, bibl. 13. [Univ. Maryland, College Park]

699 LUTZ, J. M. **Influence of temperature and length of curing period on keeping quality of Porto Rico sweet potatoes.** *Proc. Amer. Soc. hort. Sci.* 1952, **59,** 421-5, bibl. 12. [U.S. Dep. Agric., East Grand Forks, Minn.]

Studies were made during 1944-8 in Mississippi to determine the optimum period for curing sweet-potato tubers at different temperatures. Temperatures used were 74, 80, 84, 90 and 95°F. and curing periods ranged from 2 - 10 days at 95°F., to 7 - 28 days at 74°F. Relative humidity during the curing period ranged from 75 - 83%. The lowest incidence of tuber decay occurred at a temperature of 84°F., a curing period of 4 days at this temperature being ample. Curing for 2 days at 95°F. was satisfactory, while exposure at 95°F. for 10 days resulted in a considerable amount of tuber rot. Curing at 74 and 80°F. resulted in considerably more tuber decay than at 84°F. No curing treatment adversely affected the culinary quality of the tubers.—P.J.B.

CASSAVA

700 MALAYAN AGRICULTURAL JOURNAL. **Notes on current investigations October to December, 1951.** *Malay. agric. J.* 1952, **35,** No. 1, 36-52.

In a variety and time of harvesting experiment on cassava [p. 49] carried out at Melor, Kelantan, the varieties Kekabu and Medan out-yielded all other varieties with a crop of 9.5 tons of tubers per acre. The yields obtained from crops harvested 12 and 14 months after planting were significantly greater than those from crops harvested 10 months after planting. The variety Kekabu is more palatable than Medan.—W.J.B.

FIBRE CROPS

COTTON

701 Kanniyan, K. and Balasubramanian, R. **The interrelation of factors controlling yield and quality of irrigated Cambodia cotton in Madras State.** *Indian Cott. Gr. Rev.* 1951, **6,** No. 3, 119-30, bibl. 6, illus. [Cott. Breed. Sta., Coimbatore]

Trials on Madras Uganda 1 cotton to determine optimum sowing-date and seed rate, were conducted during the 3 winters 1948-50, the lay-out being a split-plot design replicated four times. Sowing dates varied from 5 September to 20 October and inter-plant spacings were 3, 6 and 9 inches in rows 2.5 ft. apart. Rainfall was below average. The best yields and quality resulted from close spacing and from early sowing. The advantage of close spacing was less evident in early-sown crops. Control of jassids by 0.2% Gueserol 550 induced shedding of leaves and buds and reduced yields.—W.J.B.

702 Rivero, J. M. del. Defoliación del algodonero con cianamida de calcio. [**Cotton defoliation with calcium cyanamide.**] *Bol. Inst. Invest. agron.* 1952, **12,** No. 26, 167-77, bibl. 10, English summary p. 176. [Esta. Fitopat. Agric., Burjasot, Valencia, Spain]

Information is given on artificial defoliation of cotton in the USA. The use of calcium cyanamide dust for this purpose is described with a view to its development in Spain. The climatic, soil and plant conditions influencing defoliation are briefly examined. The possible synergic action of calcium cyanamide and sodium fluosilicate, and the toxicity of the latter to cotton, are discussed.—E.B.O.

703 Fernando, L. H. **Recent advances in the improvement of cotton in Ceylon.** *Trop. Agriculturist* 1952, **108,** No. 1, 29-36, bibl. 6, illus.

The history of the improvement in quality and yield of the Ugandan cotton BP79 in Ceylon is recounted. The climate and soil conditions required by cotton are discussed and an attempt is made to delimit the area in Ceylon where these conditions are found. An experiment, in which the yields of 12 varieties were compared, is described. BP79 was significantly out-yielded by 5143 × Cambodia, Mwanza 561, Mwanza local, Co.2 and Co.3—W.J.B.

704 Holstun, J. T. **Post-emergence screening of chemicals and methods for weed control in cotton.** *Proc. 5th Southern Weed Conf., 1952* 1952, 79-87.

The results are given of 4 preliminary trials with post-emergence herbicidal treatments, including DNOSBP, pentachlorophenol (PCP), CMU, chloro IPC (ClIPC) ClIPC + DNOSBP and fortified and non-fortified oils. Water-soluble DNOSBP at rates of 0.4, 0.8 and 1.6 lb. per ac. gave poor control of emerged weeds, though no injury was caused to the cotton. DNOSBP and PCP, both in non-phytotoxic oil, applied at rates of 0.4, 0.8 and 1.6 lb. per ac. controlled emerged weeds, but the rates necessary to secure residual action against germinating weeds injured the cotton. CMU applied in water at rates of 0.4, 0.8 and 1.6 lb. per ac. was ineffective against established weeds, but controlled germinating weeds. No injury was caused to the cotton at these rates of treatment. In all cases, 2 applications of these herbicides were made on 27 June and 11 July, following sowing on 7 June. In a second trial, ClIPC at rates of 0.8, 4, 8 and 16 lb. per ac., both with and without the addition of 0.4 lb. per ac. DNOSBP, was applied in both oil and water carriers on 28 June and 11 July in bands over the drills. Injury to the cotton was slight following treatment with up to 8 lb. per ac. ClIPC alone. Weed control in established weeds was poor, but control of germinating weeds was good. The ClIPC + DNOSBP mixtures gave better control of emerged weeds than ClIPC, alone, but caused considerably greater injury to the cotton. In trials with directionally applied fortified and non-fortified oils, results indicated that cotton sown with 3 or more plants per hill was more resistant to laterally-directed, post-emergence oil treatments, than was cotton sown at 1 plant per hill.—P.J.B.

705 Gaines, J. C. and others. **Insecticidal control of thrips on cotton.** *J. econ. Ent.* 1952, **45,** No. 5, 790-4, bibl. 6. [Tex. Agric. Exp. Sta.]

The following insecticides, applied at comparatively low doses, gave good control of thrips, *Frankliniella tritici*, *F. fusca* and *F. exigua*, for at least 2 or 3 days: Parathion, EPN, DDT, γBHC, γBHC-DDT, Aldrin, Dieldrin and Toxaphene. Dieldrin, Toxaphene, EPN and DDT were effective for 7-10 days, thus exhibiting a longer residual toxicity than the other preparations. In one trial, the dust and spray formulations of Toxaphene, Aldrin and Dieldrin were equally effective. High doses of Systox and octamethylpyrophosphoramide were effective for immediate control of thrips, but failed to show a long residual toxicity. Malathon was not as effective as Parathion and TM 269 was about as effective as Dieldrin.—From authors' summary.

706 Lowry, W. L. and Calhoun, S. L. **Control**

of yellow-striped armyworm on cotton with organic insecticides. *J. econ. Ent.* 1952, **45,** No. 4, 741, bibl 1. [Mississippi Agric. Exp. Sta.]

he yellow-striped armyworm, *Prodenia ornitho-lli*, caused considerable damage to cotton crops the Mississippi Delta during the spring and mmer of 1951, especially to young cotton plants rly in the season. Results from trials with 11 new secticides showed that *P. ornithogalli* was resisnt to most of the chlorinated hydrocarbon inecticides and that EPN, the only organic phoshate tested, was by far the most effective. At the w-dosage levels, 0.10 lb. of EPN, 0.33 lb. of oxaphene, and 0.03 lb. of compound 269, applied small cotton plants at the rate of 1 gal. of spray er acre, gave excellent, satisfactory and subantial control, respectively. Higher dosages of the secticides showed that 0.20 lb. of EPN, 0.33 lb. of DE, 0.85 lb. of Toxaphene and 0.33 lb. of DDT ave perfect, good, satisfactory and substantial conrol, respectively.—E.B.O.

07 CAMPBELL, W. V. and HUTCHINS, R. E. **Toxicity of insecticides to some predaceous insects on cotton.** *J. econ. Ent.* 1952, **45,** No. 5, 786-9 and 828-33, bibl. 10. [Mississippi State Coll.]

08 MCKINSTRY, A. H. and JAMES, R. W. **Progress report for the season 1950-51 of the Cotton Research Station, Gatooma, S. Rhodesia.** *Progr. Reps Exp. Sta. Emp. Cott. Gr. Corp. 1950-1951* 1952, 102-4.

he object of the experiment reported was to examine the effect of 16 insecticidal treatments on e development of Sudan-, American- and spinyollworms, cotton stainers and aphis [scientific ames not given]. The following treatments were iven : (a) 2 lb. technical Toxaphene as miscible il ; (b) 2.5 lb. technical DDT as emulsion liquid ;) 4 lb. of wettable powder mixture containing)% DDT and 12% Parathion ; (d) Pestox 3 at a rength of 0.33% of the active ingredient. Pestox was mixed either with DDT or Toxaphene in cerin treatments. In others, either DDT or Toxahene was applied alone. Two applications of DDT, ne applied at the beginning of flowering and one a rtnight later, reduced American bollworm poputions. Similar applications of Toxaphene reduced merican bollworm larval numbers, but not to the me extent as DDT. Pestox 3 was effective in conolling aphid populations for 4-5 weeks after applition. All treatments containing Pestox 3 gave e highest yield of cotton.—K.L.

09 TARR, S. A. J. **Seed treatment against blackarm disease of cotton in the Anglo-Egyptian Sudan. I. Dry dressings, laboratory evaluation of bactericides and the toxicity of mercuric chloride-iodide powders to cotton seed.** *Emp. Cott. Gr. Rev.* 1953, **30,** No. 1, 19-33, bibl. 2. [Gezira Res. Fm, Wad Medani, Anglo-Egyptian Sudan]

Numerous substances were investigated as seed dressings for control of blackarm disease (*Xanthomonas malvacearum*) of cotton. Included were certain copper compounds, organic fungicides, sulpha-compounds, antibiotic substances, dyes, hormone weedkillers and mercury compounds. Varying degrees of effectiveness were shown, but only mercurial dressings gave adequate protection under Gezira conditions. Of the non-mercurial compounds, cuprous oxide showed most promise. Several experimental organo-mercurial dressings were very effective and merit further large-scale field testing. Experimental modifications of the standard mercuric chloride-iodide powder treatment used in the Sudan were investigated, e.g., increase in mercury content gave better protection whilst addition of certain dyes to the dressing rendered it less effective. The possible vapour action of certain mercurial seed dressings is discussed. It was found that laboratory methods of estimating toxicity of bactericides to *X. malvacearum* could provide useful preliminary information but could in no way replace field trials.—Author's summary.

710 ABRAHÃO, J. and ANDRADE, A. C. A "fome de potássio" ou " vermelhao" nos algodoais do estado de São Paulo. [**Potash hunger or " red disease" in the cotton growing areas of the state of Sao Paulo.**] *Biologico* 1952, **18,** No. 6, 91-102, illus.

Since 1948, potash hunger, also known as cotton rust, has been responsible for reduced yields of cotton in certain areas of the state of São Paulo, Brazil. The disease is associated with exhausted soils where acidity and deficiency in organic matter (and consequently of water) reduces the availability of K. On such soils the disease can be aggravated by : (a) low rainfall in the growing season, (b) the use of high-yielding varieties of cotton and (c) the early sowing of cotton. The symptoms of potash hunger are described in detail. In field experiments it was not found possible to prevent potash hunger by applications of N (cotton cake) P and K to soils where the disease normally occurs. Campinas I. A. 817, a variety suitable for soils of medium to good fertility, was found unsuitable for soils where potash-hunger occurs.—W.J.B.

711 PORTJANKO, V. F. [**The distribution of water in the vegetative and reproductive organs of cotton.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1952, **84,** No. 4, 829-32, bibl. 4.

The stem of the cotton plant fulfils the function not only of a conducting system but also of a reservoir for water from which the several plant organs make good their deficit of water if the root system is not in a condition to satisfy their requirements. Changes in the water content of the vegetative and reproductive organs of cotton are also observed during the ripening period. From the 3-4 leaf phase the content of water increases in all the organs up to ripening : from the moment when ripening begins, the amount of water begins to decline gradually. Loss of water in the bolls does not cause loss of water in the shoots (sympodia) while the latter bear green leaves or green bolls. With the dying off of the leaves, however, the moisture in the lateral branches and in the main stem declines sharply.—R.P.J.

712 Lane, H. C. and Hall, W. C. **The effect of applied sugars, light intensity, and temperature upon the chemical defoliation of cotton.** *Science* 1952, **116,** No. 3016, 427-8, bibl. 15. [Texas Agric. Exp. Sta., College Station]

In 1951, cotton plants were transferred to a greenhouse and placed under the following light and temperature conditions : (a) high light intensity (8000 to 10,000 ft. c. at noon), high temperatures of 72°F. to 96°F., (b) moderate light intensity of 3000 to 5000 ft.c. at noon, with moderate temperatures of 74°F. to 88°F., (c) darkness and high mean temperature of 98°F., (d) darkness and moderate mean temperature of 83°F. When no starch was detectable in the leaves of plants held in darkness, aqueous solutions of 3% Na chlorate-pentaborate and 2% Endothal (disodium 3, 6- endoxohexahydrophthalate + ammonium sulphate), each with and without dextrose, levulose and sucrose, were applied to the plants. At 24 hr. after application of the defoliants, leaf abscission had begun on plants held in the dark and treated with the defoliants + sugars, but none had occurred on plants held in the dark and treated with the defoliants alone. Abscission within 24 hr. of treatments occurred on all plants held in the light and treated with both defoliants + sugars and defoliants alone. Under all temperature and light conditions, the addition of sugar to the defoliants resulted in more leaf abscission than where the defoliants were used alone. The 3 sugars used did not differ in their ability to produce this effect. In other experiments the treatment of plants with high concentrations of sugars has inhibited leaf abscission in cotton where the sugars were applied prior to defoliant treatment, or in combination with the defoliants.—P.J.B.

713 Garay, A. and Antal, E. Tájékozódó kísérletek a gyapot terméselrúgásának növényélettani és biokémiai okairól. **Informative experiments on the biological and biochemical causes of fruit-drop of cotton.** *Agrokém. és Talaj.* 1952, **1,** No. 3, 353-68, bibl. 21. [Received 1952] [Res. Inst. Cott. Prod., Székkutas, Hungary]

The paper comprises a summary of research over 1 year, with Bulgarian cotton, type 49. The following conclusions are drawn : The drop of reproductive organs of cotton is the consequence of exterior conditions acting as stimuli. The reproductive organs are most susceptible to these stimuli after blossoming time when the activity of the enzymes polyphenoloxidase and catalase, the content of dry substance and the viscosity of the extracts are suddenly reduced. The connexion between fertilization and fruit-drop mentioned by various authors does not conflict with these results since it is known that pollen particles and embryos are important sources of enzymes. It must be noted that these tests support the hypothesis of Maximov who pointed out that lack of nutrients affects fruit-drop by reducing the activity of enzymes.—From authors' summary.

714 McKinlay, K. S. **Phytotoxicity of BHC to cotton.** *Emp. Cott. Gr. Rev.* 1952, **29,** No. 4, 269-72, bibl. 5. [Namulonge Res Sta., Uganda]

Early-sown cotton was sprayed to run-off with BHC at two strengths equivalent to 0.065% and 0.025% gamma isomer. Phytotoxic symptoms of a mosaic type, on young leaves only, resulted from multiple applications of low concentrations and from single applications of high concentrations. In no case were reductions in yield of cotton noted. Laboratory experiments showed that development of seedling roots was inhibited by BHC but not appreciably by the pure gamma isomer. Therefore the breakdown products of BHC rather than the pure gamma isomer were considered responsible for the phytotoxic effects of BHC sprays.—W.J.B.

715 Panse, V. G. and others. **Co-ordinated manurial trials on rainfed cotton in peninsular India.** *Indian J. agric. Sci.* 1951, **21,** No. 2, 113-35, bibl. 5, illus. [Inst. Pl. Industr., India]

Standardized trials were conducted from 1943-8 at 15 experimental stations on black soils in India to determine : (a) the relative effectiveness as nitrogenous manures for cotton crops of ammonium sulphate and groundnut cake, (b) the effect on cotton yields of applying the manures by broadcasting and drilling, (c) the relationship between the rate of application of N and the yield of cotton, (d) the influence of soil fertility and rainfall on the results of treatments (a), (b) and (c). Ammonium sulphate and groundnut cake were almost equally effective as sources of N. The response of the yields of cotton to applications of N was not significantly influenced by the method of applying the manure. The increase in yield of cotton resulting from a given increment of N was greater on more fertile than on less fertile soils. Tables were drawn up for the prediction of yield from the data of soil fertility and rate of application of N. For the purose of yield prediction " soil fertility" is assessed ccording to the cotton yield of the unmanured oil. [Soil analyses are not taken into account.] 'he small differences in annual rainfall between tations had no significant influence on the yield of otton.—W.J.B.

LAX

16 DIEHL, R. and du CRÉHU, G. Le lin dans la région de l'ouest. [**Flax cultivation in western France.**] *Bull. tech. Inform.* 1952, No. 69, 279-85. [Sta. Amélior. Pl., Rennes]

'ibre flax is grown on more than 2000 ha. in Britany, whereas the growing of oil flax, mainly in the ennes basin and in the south of the Loire, is still the experimental stage. An account is given of ie varieties used and results obtained during the ıst few years with these 2 crops.—E.B.O.

17 OPTIZ, K. Ökologisch-geographische Versuche mit Lein. [**Ecological and geographical experiments with flax.**] *Z. Acker- u. Pflbau* 1949, **91,** No. 2, 234-64, bibl. in text. [Received 1952]

discussion is presented of the results of flax ials conducted by 8 German research stations om 1938 to 1942. The variety Daros II was grown localities which differed very widely in georaphical position and climate, namely, Kiel, Berlin, reslau, Bonn, Giessen, Munich-Nederling and Weienstephan. Information is given on the following oints : duration of the different phases of developient ; critical sowing time ; results of postponing owing date (reduced performance) ; average yield nedium only during the 5 years) ; water requireients as a decisive factor governing performance; ie marked reaction of the valuable characters of ax to external conditions ; the greater susceptiility of oil flax (compared with fibre flax) to exrnal conditions ; the relations between temerature or rainfall on the one hand and iodine alue on the other. Western and southern localities which early sowing is generally feasible are prerable to the northern and eastern localities for enuring reliability of yield and a high-quality prouct.—G.M.R.

18 LARSEN, A. Forsøg med forskellig forfrugt til spindhør 1944-1950. [**Trials with different preceding crops for fibre flax 1944-1950.**] *Tidskr. Planteavl* 1952, **55,** No. 4, 557-77, bibl. 9.

rials were carried out during 1944-50 at Lyngby ıd Aarslev in Denmark to determine the effect on ie fibre yields of flax of the following preceding ops: clover/grass mixtures, mangolds, swedes, potoes, oats and barley. After retting, flax yields were 60, 647, 650, 668, 646 and 645 kg. per ha., respectively, following the preceding crops named above, in that order. After green scutching, yields were 646, 665, 640, 687, 668 and 667 kg. per ha., respectively. The use of clover/grass mixtures as the preceding crop resulted in high straw yields, but relatively coarse, weak flax fibres. Fibre yields from both retting and green scutching were highest following potatoes. Root crops grown as the preceding crop resulted in highest fibre quality. In terms of economic returns on green-scutched fibre, flax following swedes gave the poorest results. Following oats, the fibre was somewhat coarse and weak, but economic returns were the best of all the crops, though closely followed by barley. Clover/grass mixtures as the preceding crop resulted in seed yields 5-10% higher than following the other crops. Root crops resulted in the lowest seed yields.—P.J.B.

719 JOURNAL OF THE DEPARTMENT OF AGRICULTURE. WEST AUSTRALIA. **New flax variety** [**in W. Aust.**]. *J. Dep. Agric. W. Aust.* 1952, **1,** No. 5, (3rd Ser.), 607.

The new flax variety Boyup, which has recently been released for commercial cultivation, is a blue-flowered, early-maturing variety, the result of a natural cross between Wada and Concurrent. Boyup gives excellent yields of fibre. It is slightly taller than Wada, has stronger straw and possesses a higher degree of rust-resistance than either of its parents.—K.L.

720 DENMARK. Statens Forsøgsvirksomhed i Plantekultur. Medd. 466. Forsøg med sorter af spindhør 1946-1950. [**Varietal trials with fibre flax, 1946-1950.**] *Tidsskr. Planteavl* 1952, **55,** 547-50.

The results are given of 2 series of trials at 5 locations in Denmark. In the first series during 1946-8, inclusive, 8 varieties were used, while 10 varieties were included in the second series during 1949-50, inclusive. In the first series, the highest fibre yield of 794 kg. per ha. was given by Liral Sussex, followed by the Latvian Priekulu 665, with 749 kg., and Liral Prince, with 733 kg. per ha. In the second series, Hareskovgaard 75 gave the highest yield, with 704 kg. per ha., followed by Liral Sussex, 657, Svaløf's Margareta 637, and Percello, with 631 kg. per ha. Concurrent was last, with 596 kg. per ha. A short description is given of each variety.—P.J.B.

721 DANELL, N. Försök med spånadslin. Resultat av växtodlings-, ogräs och gödslingsförsök under åren 1943 (38)-1950 (51). [**Trials with fibre flax (in Sweden). Results of trials on cultivation, weed control and manuring during the years 1943 (38) to 1950 (51).**] *Medd. 39 Statens Jordbruksförsök* 1952, pp. 57, bibl. 6, illus, English summary pp. 54-6.

The summarized results are given of varietal, manurial and weed-control trials carried out over a wide range of locations in Sweden. In the varietal trials, 18 varieties of fibre flax, about half of which were of foreign origin, were used, with Hercules as a standard. In south Halland and the south Swedish middle-lands and uplands, Gerda, Margareta and Formosa were superior to Hercules in both fibre and seed yields. In the west Swedish plains, only Concurrent gave fibre yields comparable with Hercules. In middle Sweden, Concurrent gave higher seed yields than Hercules, while Kristina gave the highest fibre yields. In 198 trials carried out up to 1950, Gerda and Formosa have given the highest mean fibre yields, followed by Concurrent and Hercules. In a series of 11 trials, Margareta and Kristina outyielded all other varieties in fibre yields and gave seed yields comparable with those of of Hercules. In manurial trials, no consistent response to P has been obtained. In almost all parts of Sweden, fibre yields have increased following K treatment. Cl-free K has not proved superior to normal 40% commercial K salts in raising yields. The application of 200 kg. per ha. of KNO_3, or sulphate of ammonia, has raised country-wide fibre yields by an average of 230 kg. per ha. Yield responses to B have also been obtained in some areas. Applications of agricultural salt have not affected yields. Trials have indicated that a seed rate of 140 kg. per ha. is suitable. Combined time-of-sowing and harvest-date trials showed that harvesting of flax should take place when the leaves have withered, or fallen, from half the stem and the seed pods have turned slightly brown. Arising from the weed-control trials, the following provisional recommendations are made : spraying with Agroxone, or other hormone herbicides, should be made at a rate of 3.5 l. per ha. before the crop is above 5 cm. tall ; DNOC preparations can be applied at rates up to 5 kg. per ha. when the crop is 12 cm. tall ; mixtures of DNOC and hormone derivatives can be recommended ; spray-pump pressure should not exceed 12 kg. per $cm.^2$—P.J.B.

722 BOERGER, A. Calidad de fibra en linos de La Estanzuela. [**The fibre-quality of flax at La Estanzuela.**] *Arch. fitotéc., Uruguay* 1952, **5,** No. 1, 112-17, bibl. 6, illus., English summary p. 175. [Inst. Fitotéc., La Estanzuela]

A study was made of the fibre-quality from flax varieties of varying genetic constitution grown at La Estanzuela in the years 1948-50. A fibre of good quality was obtained from La Estanzuela E2E3, a pasmo-resistant, dual-purpose variety, capable of yielding both fibre and oil.—W.J.B.

723 DENMARK. Statens Forsøgsvirksomhed i Plantekultur. Medd. No. 481. Ukrudtsbekaempelse i spindhør med kemiske midler. [**Weed control in flax with chemicals.**] *Tidsskr. Planteavl* 1952, **56,** No. 1, 169-72.

The results are given of 3 series of trials carried out at 4 locations in Denmark. In the first trial series, 9 trials were carried out in which 3% $CuSO_4$, 5 kg per ha. Herbanit (25% DNOC Na salt), 2.5 kg. pe ha. of 20% Herbatox-D (D-type) and 5 l. per ha. o 10% Dicotox (M-type) were applied to flax. In eac case, 1000 l. per ha. of aqueous solution were used The herbicides were applied when the crop was 4 t 8 cm. high. Average yields of long fibre were 639 kg per ha. for untreated flax and 637, 670, 509 an 644 kg. per ha. for flax treated with the abov herbicides in the order given. From these results i was concluded that Herbatox-D (D-type) herbicides should never be used on flax. Fibre lengt and strength were greatest following the use o Herbanit, whilst Dicotox (M-type) was the mos effective in controlling weeds. In the second tria series, a mixture of 2.5 kg. per ha. of Herbanit + 2.5 l. per ha. of 10% Dicotox was used. The averag yield of long fibre in 7 trials was 385 kg. per ha. fo controls, 344 kg. for 3% $CuSO_4$, 386 kg. for 5 kg per ha. of Herbanit, 390 kg. for 5 l. per ha. of 10% Dicotox and 403 kg. per ha. for the Herbanit + Dicotox mixture. No determinations of weed control effectiveness were made. In the third tria series, the following treatments were compared i 12 trials : (a) 5 l. per ha. of M-type hormone, (b Herbanit (or Sevtox) at 3.5 l. per ha., (c) Herbaso at 2.5 l. per ha. + 2.5 l. per ha. M-type hormone an (d) Herbasol at 1.7 l. per ha. + 2.5 l. per ha. M-typ hormone. The average yields of long fibre wer 614 kg. per ha. for untreated controls and 620, 622 667 and 651 kg. per ha., respectively, for the herbicidal treatments in the order given above. Fro the results, it was apparent that the mixtures gav the best results in terms of fibre and seed yields also, weed control was slightly better following th use of mixtures, compared with herbicides use singly. On the basis of these trial results it is concluded that herbicidal spraying of flax shoul be done only in dry weather; that rates of application should be slightly reduced in hot weather; tha all treatments should be made when the crop i between 4 and 8 cm. high, and that low-volum sprays of 300 to 400 l. per ha. should not be used The most satisfactory treatment is 2.5 kg. per ha of Herbanit + 2.5 l. per ha. of 10% M-type hormone herbicide.—P.J.B.

724 BRITISH ASSOCIATION. **Botany of flax** *Nature, Lond.* 1952, **170,** No. 4327, 557-9.

The meeting of Section K (Botany) of the Britis Association held on 8 September, 1952, in Belfast embraced a general survey of the botany of flax After a brief introduction to the history of fla breeding and improvement (particularly in Northern Ireland) the question of seed health wa discussed. The importance of health surveys i indicating the most suitable areas of the Unite Kingdom (south and east) for producing health flax seed was stressed. A paper on the physiologica pecialization of *Melampsora lini* (flax rust) showed hat the varieties Textilshchik, USSR No. 2, 1288/-.2 and Stakhanovets from the USSR and the ariety Wada bred in Australia were immune to all he known British races of rust and indicated that hese varieties should be used in the United Kinglom to provide the basic breeding material for ombining rust resistance with good-quality fibre nd high-yielding ability. Experiments on the use f selective herbicides for the control of weeds in lax were described [see *Fld Crop Abstr.* 5 : 1241]. Results of this work suggest the use of sodium nethyl-chlorophenoxyacetate at a rate of not more han 0.75 lb. per ac., applied when the crop is etween the cotyledon stage and 6 in. high. Alhough a considerable advance has been made in hese investigations on selective weed control in lax, the weed problem is not yet solved.—K.L.

25 RÜDIGER, W. Morphologisch-anatomische Untersuchungen am Kelch des Leins *Linum usitatissimum* L. Ein Beitrag zur Diagnostik der Leinsorten. [**Morphological and anatomical examination of the calyx of flax, *Linum usitatissimum* L. A contribution to the identification of varieties of flax.**] *Züchter* 1951, **21,** No. 1/2, 39-41, bibl. 4, illus. [Max-Planck Inst. Bastfaserforsch., Niedermarsberg/Westfalen, Germany]

n the earlier Ministry of Nutrition register of arieties, the presence of pale spots on the sepals of .. *usitatissimum* was given as a character for dentification of varieties of flax. This feature has ow been investigated anatomically. Spots, light reen in colour and oval in shape, occurred each ide of the midrib of the sepal. Where the spots ppeared there was an absence of parenchyma tissue eneath the epidermis and a consequent lack of hlorophyll which accounted for the pale colour. 'he character is considered to be unreliable beause it is labile and varies from year to year. Other pecies of *Linum* will be investigated when opporunity occurs.—D.B.

OIL CROPS

INSEED

26 SHEPHERD, R. W. **Linseed cultivation trials in East Anglia, 1948-50.** *Agriculture, Lond.* 1952, **59,** No. 8, 381-5. [Norfolk Agric. Sta., Sprowston]

'he results are given of trials carried out on lightnedium loam and on light, sandy soils, in which nseed was sown in mid-March, mid-April and midIay, with different manurial treatments, row idths of 4 and 8 in. and seed rates ranging from 5 to 100 lb. per ac. The results indicated that on ght-medium loam in Norfolk, highest yields followed sowing in mid-May when the soil had warmed up and when weeds could be controlled by cultivation before sowing. The variety used in all trials was Royal, which is relatively late-maturing. Delayed sowings resulted in delayed harvest and considerable difficulties in drying the crop. On the light, sandy soil, March sowings were satisfactory in all but very late years. In most cases, it was better to sow early and to control weeds with herbicides and use DDT for controlling flax flea-beetle, than to risk the difficulties of late harvest ; but sowing should not take place before the soil has warmed up. An economic response to amounts of up to 4 cwt. per ac. of balanced fertilizer was obtained on many soils. It was concluded that a seed rate of 50-60 lb. per ac. was the optimum. In most cases, 4 in. rows gave slightly higher yields than 8 in. rows, but differences were not significant.—P.J.B.

727 DE FINA, A. L. and CASTELLS, R. Doce años de cultivos repetidos de linos oleaginosos. [**Twelve years of repeated sowings with linseed.**] *Rev. Fac. Agron., La Plata* 1951, **28,** 1a, 1-30, bibl. 12, illus., English summary pp. 27-9. [Received 1952] [La Plata Univ.]

In the period 1938-49 approximately 12 varieties of linseed were sown early in August each year in an experiment to determine the reaction of the different varieties to continuous cropping on the same land. Two adjacent plots on fallow land were used for the experiment which was laid out in a Latin square design. Plot A carried the experiment for the first 3 years and after a rest from linseed of 3 years carried the experiment for a further 3 years. Plot B carried the experiment for the second period of three years (1941-3) and after 3 years' rest from linseed carried the experiments for the final 3 years (1947-9). The climatic conditions and the manurial status of the soil during the experiment are described. No attempt to control weeds, pests or diseases was made and no manures were applied. The general effect of marchitamiento (wilt caused by *Fusarium lini*) was unimportant and insufficient to explain the decline of yields over the whole period. The average yield of the first 6 years was 1035 kg. per ha. (10.5 cwt. per acre) and in the second period of 6 years 737 kg. per ha. (5.8 cwt. per acre). In general, differences of yield between varieties were not significant over the whole period. There was a significant difference between the yield of the highest yielder over 12 years, Población Facultad, and those of the lowest yielders, Buck 3, La Previsíon 18 and Klein 11. There are graphs showing the efficiency of each of 12 varieties over the period 1943-50. The efficiency of a variety is its yield expressed as a percentage of the yield of the highest yielder in the same year in the same experiment. To each of these 12 varieties an index of reliability of efficiency is assigned according to the method of de Fina. This index expresses the degree to which a variety maintains its efficiency in an experiment lasting several seasons. Thus a high index reflects the ability of a variety to adapt itself to the varying environmental conditions prevailing over a period of years. The highest indices of reliability of efficiency were assigned to the varieties P 330 M.A., Entre Rios and Querandi M. A.—W.J.B.

728 BARRONS, K. C. and others. **Tolerance of flax to sodium TCA.** *Down to Earth* 1952, **7,** No. 4, 11-12. [Dow Chem. Co., Md, Mich.]

In trials in Minnesota, Na TCA was applied to linseed at rates of 4, 8, 12, 16 and 20 lb. acid equivalent per ac. in a spray volume of 16 gal. per ac. The linseed was 3 to 4 in. high and annual grass weeds 1 to 2 in. high. Rates of 8 lb. per ac. gave excellent control of the annual grasses, with only a slight delay in the maturation of the linseed, compared with untreated controls. Rates of above 8 lb. per ac. delayed the maturity of the crop and also reduced its height, compared with controls. Na TCA applied at 80 lb. per ac. retarded the growth of linseed, but was not lethal. Medium volume, low pressure sprays were most suited for TCA application ; low volume sprays tended to cause leaf burn. Na TCA had no effect on the oil content of the seed, or the iodine number of the oil. Applications of Na TCA in combination with the amine salts of MCPA or 2,4-D caused greater yield reductions than sprays of individual herbicides alone, mainly owing to the relatively greater wetting power of the combinations. MCPA, particularly the amine formulation, caused less injury to linseed than 2,4-D. Spray volumes of 15 to 20 gal. per ac. have proved satisfactory as carriers for mixtures of herbicides. —P.J.B.

729 CRUICKSHANK, I. A. M. **Rust of linseed and linen flax : life cycle and control.** *N. Z. J. Agric.* 1952, **85,** No. 2, 123-4, bibl. 2. [Dep. Sci. Industr. Res., Auckland, N. Z.]

Linum rust (*Melampsora lini*), a disease of linseed and linen flax, was first recorded in New Zealand by Cunningham in 1927, since when it has occurred to a greater or less extent each season. In 1947-8 a rust epidemic in Canterbury seriously threatened the survival of the linseed and linen flax industries. Since then they have recovered, the area in linseed being over 30,000 acres in the 1951-2 season, but rust still remains. Recent surveys and research have suggested ways in which the danger can be lessened. These control methods depend on a knowledge of the different stages in the life cycle of the rust fungus, and in this article these stages and the control methods are described.—Extract.

730 PASSLOW, T. ***Heliothis* control in linseed [in Queensland].** *Qd agric. J.* 1952, **75,** No. 4, 240-1, illus.

731 GLADKIĬ, P. P. [**Concerning the influence of heteroauxin on the agronomic characters of linseed in connexion with the water regime.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci USSR*) 1952, **84,** No. 4, 817-20, bibl. 10. [All-Union Sci.-Res. Inst. Oil Crops, Krasnodar]

In pot trials with linseed (*Linum usitatissimum*) in 1948 and 1951, sprinkling of the plants with heteroauxin during a period of drought led in some varieties to an increase, in others to a reduction, in the yield of seed. Both the positive and the negative effect of heteroauxin was manifested for a considerable period after sprinkling. Heteroauxin stimulated the growth (lengthening) of the inflorescence. Sprinkling with heteroauxin after drought led, in all the varieties investigated, to an increase in seed yield, but in varying degree. The most effective time for sprinkling in many varieties was during the first few days after the transition of the plants from an inadequate to an adequate supply of water.—R.P.J.

732 HERMIDA, E. V. Determinacion del tenor oleaginoso por percolacion en pequeñas muestras de semillas de lino. [**A percolation test for oil content in small samples of linseed.**] *Arch. fitotéc., Uruguay* 1952, **5,** No. 1, 149-60, bibl. 13, illus., English summary p. 177.

A description is given of a semi-micro method of oil extraction from linseed suitable for use in plant-breeding stations when it is necessary to make rapid tests on small quantities of material.—W.J.B.

SUNFLOWER

733 DE SOUSA, O. F. and others. Ensaios de variedades de girassol. [**Variety trials with sunflower.**] *Bragantia* 1951, **2,** Nos. 4-6, 165-9, bibl. 3. [Received 1953] [Inst. Agron., Campinas]

Trials were carried out in three different areas of the State of São Paulo, Brazil, in the years 1946-9 to determine the behaviour of 25 varieties of sunflower (*Helianthus annuus*). The most promising varieties were Riscado, La Estanzuela No. 53, Línea-16, Línea-30, Gigante da Rússia no. 64, and Sel. Fischer 100. Sel. Fischer 100, a new variety, outyielded all varieties in two areas in 1948-9.—W.J.B.

734 GUNAR, I. I. and others. [**The effect of 2,4-D on metabolism in the sunflower under different temperatures.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1952, **84,** No. 1, 173-6, bibl. 14, illus. [Timirjazev Agric. Acad., Moscow]

The use of 2,4-D as a plant growth stimulator and herbicide has raised interest in the biochemical changes which the compound induces in the plant. A study was made of changes in carbohydrate, nitrogen and phosphorus metabolism in sunflower in relation to the temperature prevailing during the plant's growth, and an attempt was made to determine the cause of the greater toxicity of 2,4-D with increased temperatures. The variety Saratovskiĭ 169 was grown in cultures under controlled conditions, described, and subjected to spraying with 2,4-D sodium salt in concentrations 0.001, 0.01 and 0.1% applied in two phases. Tabulated data are given of (1) content of soluble carbohydrates (in % of air-dry wt) in leaves and stems at different temperatures (control and treated plants); (2) content of N in leaves; (3) content of phosphoric compounds in leaves (in mg. P_2O_5 per 1 g. air-dry wt). The data show the increased toxicity of 2,4-D with increased temperatures. It is concluded that one of the primary causes of this is the greater suppression of nucleoproteid and phosphatide synthesis in leaves of the treated plants.—M.H.

RAPE

735 Roux, A. Vergleichende Untersuchungen an den Staubbeuteln von Winterraps und Winterrübsen zum Zwecks der Verwendbarkeit als Unterscheidungsmerkmal. [**Examination of the anthers of winter rape and winter turnip rape with a view to using the anther as a distinguishing feature between these two plants.**] *Züchter* 1950, **20,** No. 1/2, 38-9, bibl. 1. [Received 1952] [Sortenamt der DWK, Nossen/Sa.]

The character in question is the presence or absence of a red spot on the anther. It is said to be present in winter rape and absent in winter turnip rape. There is, however, so high a proportion of exceptions in the varieties examined that the matter requires further investigation.—D.B.

736 Andersson, G. Svalöfs Tenus raps. [**Svaløfs' Tenus winter rape.**] *Sverig. Utsädesfören. Tidskr.* 1952, **62,** No. 5, 381-5, English summary pp. 384-5.

Tenus winter rape (*Brassica napus* var. *oleifera* subvar. *biennis*) was released to farmers in Sweden in 1951 and is a selection from a Polish variety, Wilnensis. Tenus has been tested in Sweden in 101 trials during 1946-51, in which it was compared with Svaløfs' Senraps (late rape), Lembke and Matador. In 27 of these trials at 7 locations in south Sweden, Tenus averaged 11% higher seed yields than Senraps, 2% higher yields than Lembke and 5% lower yields than Matador. In 74 trials in 6 districts, Tenus gave 9% higher seed yields than Senraps, 7% lower yields than Lembke and 11% lower yields than Matador. The average oil content of the seed of Senraps, Lembke, Tenus and Matador was 45.3, 46.9, 46.8 and 47.2%, respectively. The principal importance of Tenus lies in its outstanding winterhardiness, in which it exceeds all other Swedish varieties. It has outyielded Matador, Lembke, Senraps B and Scherwitz by a considerable margin in trials at Dickursby in Finland. It is considered that this variety is the best available for conditions in north Sweden, where it will replace Senraps.—P.J.B.

LAND USE, SURVEYS AND MANAGEMENT

737† Kerr, D. **The physical basis of agriculture in British Columbia.** *Econ. Geogr.* 1952, **28,** No. 3, 229-39, illus. [Geogr. Dep., Univ. Toronto, Canada]

About 4 million acres, or some 2% of the total land surface of British Columbia is cultivated. Land topographically suited to cultivation is markedly diffuse and small in amount, with the exception of the north-eastern sector, which lies on the edge of the Great Plains. Agricultural regions, as such, do not exist, but there are 4 recognizable agricultural districts, namely the Coastal Valleys, the Southern Interior Valleys, the Nechako Pioneer Farming Belt and the Peace River Block. The physical basis of the agriculture of these districts and the types of farming there are reviewed.—P.J.B.

738 da Mota, F. S. Esquema de divisão do Rio Grande do Sul em distritos agroclimáticos. [**The division of the State of the Rio Grande into agroclimatic districts.**] *Agros, Pelotas* 1952, **5,** No. 1, 38-48, bibl. 3, illus.

The State of Rio Grande do Sul, Brazil, is divided into 17 agroclimatic districts according to the system of classification of A.L. de Fina. [See *Fld Crop Abstr.* 5 : 543.] The cropping possibilities of any agroclimatic district can be predicted, given adequate information on the non-climatic factors influencing crop production.—W.J.B.

739 Hayot, H. Évolution de l'agriculture au Pérou. [**The evolution of agriculture in Peru.**] *Terre maroc.* 1952, **26,** No. 277, 457-63.

740† Barbosa, I. O planalto do Amboím zona de colonização. [**European settlement on the Amboim plateau, Angola.**] *Agron. angol.*

1952, No. 6, 5-76, bibl. 8, illus., French and English summaries p. 76.

An account is given of recent surveys of the topography, flora, soils, communications and agricultural production of the Amboim plateau. The agricultural output of the European settlers of the Cela, Ebo and Condé regions is analysed in detail. Millet and rice are the main crops grown. The possibility of extending the area cultivated by European settlers is discussed with special reference to the problems of drainage and irrigation.—W.J.B.

741† Bulletin Agricole du Congo Belge. Contribution à l'étude du problème de l'économie rurale indigène au Congo belge. Communications présentées par la Délégation belge à la Conférence africaine de l'Économie rurale indigène (Jos, Nigérie.—17-24 novembre 1949). [**A contribution to the study of the problem of the native rural economy in the Belgian Congo. Communications presented by the Belgian Delegation to the African Conference of Native Rural Economy (Jos, Nigeria—17-24 November, 1949).**] *Bull. agric. Congo belge* 1952, **43,** Special Number, pp. 267.

742 Bousquet, M. Le Sine-Saloum agricole. [**Agriculture in Sine-Saloum (Senegal).**] *Agron. trop.* 1952, **7,** Nos. 2 and 3, 117-35 and 233-65, illus.

This is a study of the principal crops of the Sine-Saloum, mainly groundnuts and millet (*Pennisetum* and *Sorghum* spp.). Stress is laid on the cultural methods of the Sérères which maintain soil fertility better than those practised by the other races. Measures are suggested to remedy the general land misuse which has taken place during the last 50 years.—E.B.O.

743 Sarlin, P. Statistiques agricoles, Résultats d'une enquête agricole en Nouvelle-Calédonie en 1951. [**Agricultural statistics. Results from an inquiry into the agriculture of New Caledonia in 1951.**] *Rev. agric. Nouv. Calédonie* 1952, 3, No. 5-6, 3-10, maps.

Brief information is included on maize and other crops grown in New Caledonia.—E.B.O.

744† Boardman, A. H. **High production on the small farm.** *J. Fmrs' Cl., Lond.* 1952, No. 7, 106-29.

After discussing the general factors concerned with higher production in agriculture, those specific factors which should be taken into consideration in increasing production on the small farm are described. Particular stress is laid on a balanced system of farming, increased use of machinery and improved organization in farm management.—K.L.

745 Wright, N. C. **Britain's food supplies.** *Advanc. Sci.* 1952, **9,** No. 34, 245-56.

This address was given to Section M (Agriculture) of the British Association Meeting in Belfast in September, 1952. After surveying the changes that have taken place in British Agriculture since the beginning of the 1939-45 war the author discusses the probable extent to which British agriculture will be called upon to meet this country's future food requirements.—K.L.

FARMING SYSTEMS AND PRACTICES

746 Crowther, E. M. and others. **An eighteen-year experiment on ploughing in straw and compost.** *Rep. Rothamst. Exp. Sta. 1951* Harpenden, 1952, 135-40.

An experiment was carried out in the period 1934-51 to test the value to barley, sugar-beet and potatoes of straw ploughed in during the autumn with manures applied either in the following spring or half in the autumn and half in the spring. The experiment consisted of 3 blocks cropped with barley, sugar-beet and potatoes, the crops rotating in that order. The following manurial treatments were applied: (a) no straw. N, P and K in the spring, (b) 53.3 cwt. per ac. straw in autumn followed by N, P and K in the spring, (c) 53.3 cwt. per ac. straw plus half the N, P, K application in the autumn, followed by half the N, P, K application in the spring, (d) 53.3 cwt. per ac. straw in the form of compost mixed with N and P, plus K ploughed in, all applied in the autumn. The manurial treatments were applied in alternate years so that their residual effects could be assessed. In addition to the test treatments, each plot of sugar-beet and potatoes received basal dressings of fertilizers. The ratio of N in fertilizers associated with straw or compost was chosen to conform with the Hutchinson and Richards "nitrogen factor" (0.75 parts N per 100 parts of straw) as an estimate of the amount of N likely to be immobilized by the straw. Tables are given showing for each crop the mean yields over eighteen seasons resulting from each treatment. Over the whole period the yields of barley grain and straw were reduced appreciably by the application of straw compost in the previous autumn. The yields of sugar, roots and tops of beet were reduced appreciably by straw and markedly by compost applications. The average sugar yield was 43.3 cwt. per ac. in plots treated with fertilizers nly, and 36.9 cwt. on plots treated with compost lus fertilizers. Potatoes showed a gain of about 0 cwt. per ac. from straw ploughed in during the revious autumn, provided all fertilizers were loughed in during the spring. Applications to the revious beet crop of straw and compost resulted n increased yields of potatoes of 1 ton and 12 cwt. er acre, respectively. Over the 18 years of the xperiment there was no general increase in fertility scribable to the use of straw or compost. In the ase of sugar-beet, the reduction in yield caused by pplying straw or compost (calculated by comparing the yields of plots receiving treatments (b), (c) nd (d) with those of plots receiving treatment (a)) was more marked at the end than at the beginning f the experiment. Oh the other hand, the increase n potato yields caused by applying straw in utumn before sowing, followed by fertilizers in he spring, remained fairly constant throughout the xperiment. The benefit derived by potatoes from reatments (c) and (d) increased in the course of the xperiment. The stimulating effect of straw and compost on potato yields is ascribed primarily to the potassium supplied by the straw, while the depressing effect of straw on sugar-beet yields is considered to be caused by the immobilization of N by the straw. From the results of the experiment it is deduced that the amount of N immobilized by the straw must be about 1 part N per 100 parts of straw—a figure higher than that given by Hutchinson and Richards. The results of the experiments are summarized as follows. (1) On the soil tested, the ploughing-in of straw or compost did not increase soil fertility over a period of 18 years. (2) Potatoes derived considerable benefit from applications of straw and some benefit from compost. (3) Applications of straw or compost reduced yields of barley and sugar-beet. (4) Provided that sufficient N is added to the soil (preferably at the time most suitable for the crop) to balance the loss of N caused by the straw, the straw should add to the K supply in the soil. (5) There is little sign that the N immobilized by the straw becomes available later in any significant amount.—W.J.B.

747 TYSON, J. and CRABB, G. A. **Comparative tillage tests at East Lansing, Michigan. A progress report.** *Quart. Bull. Mich. agric. Exp. Sta.* 1952, **34**, No. 4, 412-24, bibl. 7, illus.

The results are given of 6-years' trials in Michigan to compare 4 methods of tillage for wheat, maize and oats on a sandy loam soil low in available P and K. The basic rotation was maize/oats/clover/wheat. The 4 tillage methods were: (a) normal tillage with a plough, (b) disc tillage, in which crop residues were left as a mulch, (c) sub-surface tillage with sub-surface sweeps and (d) ploughing with the mouldboard removed from the plough, so as partially to mix surface residues with the topsoil. Normal tillage produced higher wheat and oat yields than the other practices, while discing produced significantly higher maize yields than all other practices. The stubble mulch practices caused considerable difficulty in weed control and reduced the availability of nutrients to the crops. Erosion losses were lowest and water infiltration was highest under the stubble mulch practices.—P.J.B.

748† KÖNNECKE, G. Ertragssteigerung und Erhaltung der Bodenfruchtbarkeit durch Umstellung von Fruchtfolgen. [**Improvement of yields and maintenance of soil fertility by changing the crop rotation.**] *Kühn-Archiv* 1951, **64**, 107-224, bibl. 108, illus. [Inst. Acker- und Pflbau, Univ. Halle/Saale]

This extensive report is based on the results of field trials conducted in the dry region of Central Germany. The following aspects of the practice of crop rotation are discussed: the best preceding crops for cereals, root, oil and leguminous crops; depth and volume of roots of the principal crops; soil moisture and soil temperature; the effect of a change in the rotation on yield; ley farming as a means of improving and maintaining soil fertility. —D.B.

749 OPITZ, K. Ein mit Düngungsversuchen verbundener Fruchtwechsel auf Sandboden. [**Crop rotation combined with manurial trials on sand soil.**] *Z. Acker- u. Pflbau* 1952, **94**, No. 3, 233-52. [Univ. Berlin]

An account is given of a manurial trial which has been in progress since 1936 on the Thyrow Experiment Farm in an environment very unfavourable for crops. The average annual rainfall is 500 mm. only, the soil is light sand on sand and very poor in moisture, humus and nutrients, especially calcium, with an acid to very acid reaction. Long periods of drought do much damage, and severe east winds often cause erosion. The crop rotation tested was winter rye/sweet lupins (replaced from 1943 by a peas-vetch mixture)/winter rye (replaced from 1942 by winter wheat)/medium late potatoes/oats/medium early potatoes. Of the detailed conclusions listed, the marked profitability of heavy applications of mineral fertilizers is outstanding.—G.M.R.

750† CHURCH, B. M. **Recent trends in fertilizer practice in England and Wales. Pt. I. The national position. Pt. 2. The use of fertilizers on cereals, root crops and grassland.** *Emp. J. exp. Agric.* 1952, **20**, Nos. 79 and 80, 249-56 and 257-70, bibl. 14. [Rothamst. Exp. Sta., Harpenden, Herts.]

Part I discusses the general character of the changes between 1944 and 1950 in the farmers' use of fertilizers for different crops. Part 2 summarizes further information from the surveys on which Part 1 was based. The possibility of increasing production by the more general use of nitrogen on cereals, fodder roots and grassland is discussed.—K.L.

751† Meiklejohn, A. K. M. **South-eastern Scotland: Agriculture.** *Misc. Publ.* 72 *Edinb. and E. Scot. Coll. Agric.* 1951, pp. 17.

After an historical survey of the agriculture in this area, an account of present agricultural practices is given. The work contains a map showing the main types of farming and a table of acreages (S.E. and all Scotland) for the following crops: wheat, barley, oats, potatoes, total tillage crops, rotation grass, permanent grass, and rough grazings.—K.L.

752 Krimgold, D. B. **Determining time and amount of irrigation.** *Agric. Engng, St. Joseph, Mich.* 1952, **33,** No. 11, 705-7, bibl. 32. [Climat. Lab., John Hopkins Univ., Seabrook, N.J.]

The practical application of Thornthwaite's concept of potential evapotranspiration for determining the time and amount of irrigation required by crops is discussed.—P.J.B.

753 Heick, F. Enårige forsøg med kunstig vanding af markafgrøder. [**Yearly trials with artificial watering of field crops (in Denmark).**] *Tidsskr. Planteavl* 1952, **55,** 433-48, English summary pp. 446-8.

The results are given of trials carried out at Jyndevad, on light, sandy soil, to determine the effect of overhead irrigation on the yield of barley, potatoes and fodder sugar-beet. In 6-years' trials with barley, watered plots received a yearly average of 82 mm. of artificial rain and yielded an average of 2620 kg. per ha. of grain and 3840 kg. per ha. of straw, or 56 and 63% more, respectively, than the yields from unwatered plots. In 5-years' trials with potatoes, the average tuber-yield from plots receiving a yearly average of 78 mm. of water was 27,500 kg. per ha. and 5960 kg. per ha. of tuber dry matter, being an increase of 18 and 21%, respectively, over unwatered crops. In 3-years' trials with Pajbjerg Rex fodder sugar-beet, plots receiving a yearly average of 130 mm. water produced an average of 61,400 kg. per ha. of roots, with 11,630 kg. per ha. of dry matter, compared with 50,300 kg. per ha. of roots and 9110 kg. per ha. of dry matter from unwatered plots. In the case of the tops, unwatered plots yielded 23,500 kg. per ha. tops and 3210 kg. per ha. of dry matter, compared with 22,100 and 2860 kg. per ha. of tops and dry matter, respectively, from watered plots. The total average yield increase of watered over unwatered plots was 18%. It is considered that in years of ample rainfall, a proportion of the nutrients were leached out of the very thin soils by the irrigations, thus limiting fodder sugar-beet growth.—P.J.B.

754† Farmer, B. H. **Colonization in the dry zone of Ceylon.** *J. roy. Soc. Arts* 1952, **100,** No. 4876, 547-64, illus. [Cambridge Univ.]

This article reviews the natural, social and historical background of modern peasant colonization in Ceylon and discusses some of the problems currently involved. In paddy cultivation, the main problem centres around the technique of the cultivator. Decreasing yields due to lack of manure and rotation are becoming evident and there is extensive waste of water. It is hoped to obtain more sustained yields of paddy by the growing of pure lines of transplanted paddy and the use of better methods of cultivation and improved implements. The control of soil erosion—especially on high land allotments—is a major problem still to be tackled. It may prove necessary to plant drought resistant trees on high lands with fluctuating water tables.—K.L.

SOIL AND WATER CONSERVATION

755† Basu, J. K. **Soil and moisture conservation in the dry regions of the Bombay State. Pt. I. Studies in soil conservation.** *Emp. J. exp. Agric.* 1952, **20,** No. 80, 326-33, bibl. 5, illus. [Bombay State, India]

Erosion measurements in run-off plots of the experiment indicate losses of soil under cereal cropping of 24-37 tons of soil per ac. p.a., as against less than 2 tons per ac. p.a. for plots under spreading legumes such as matki (*Phaseolus aconitifolius*), hulga (*Dolichos biflorus*), chavali (*Vigna catjang*), mung (*Ph. mungo*), soyabeans (*Glycine soya*), groundnuts (*Arachis hypogaea*) and wal (*Dolichos lablab*). An estimate of erosion losses over 5.4 million acres of winter-cereal crops showed that about 300,000 lb. of N and P were lost annually. A random erosion survey conducted over 80,000 ac. of cultivated land in the scarcity tract revealed that 69-73% of the total area in the Deccan and Karnatak zones, respectively, had been severely eroded. The gravity of the present situation and its future consequences on the agriculture of this region emphasize the urgency of investigations on anti-erosion measures.—K.L.

756 Maclagan Govrie, R. **Soil conservation notes: land slides.** *Trop. Agriculturalist* 1952, **108,** No. 2, 127-31, bibl. 2.

The causes of land-slides in Ceylon are discussed and an account is given of the many types of earth ovement involved. Notes are made on preventive, alliative and remedial measures which may be ken. It is pointed out that the Soil Conservation ct, No. 25 of 1951, may be invoked in cases where uthority is required to prevent the misuse of land y private owners.—W.J.B.

57 KURTZ, T. and others. **Further trials with intercropping of corn in established sods.** *Proc. Amer. Soc. Soil Sci.* 1952, **16,** No. 3, 282-5, bibl. 11, illus.

rials in Illinois are reported in which maize was wn each year in spring, with a mulch sower, in ure stands of a number of different legume and rass species established in 1947. The mulch sower lled a slit in the established stands and sowed the aize in the slit. By 1950, all the grasses had main- ained a good soil cover, with good weed control. mong the legumes, only birdsfoot trefoil (*Lotus rniculatus*), Ladino clover (*Trifolium repens* var.) nd white clover (*T. repens*) preserved good stands r 3 years under the maize. Red clover (*T. pra- nse*) and lucerne gave good weed control during e early part of the season, but deteriorated pidly when shading from the maize became ronounced. Grass stands competed severely with e maize for N supplies, the legumes to a lesser xtent. Where 100 lb. per ac. N was applied to the aize as a side-dressing, maize yields with legume tercrops approached those of maize similarly eated without intercrops ; with grass intercrops, mewhat larger N treatment was needed to bring bout a similar result. There was little difference etween the grass species in their ability to com- ete with the maize. Changes in soil moisture con- ent at a depth of 10 in. were more rapid under the over crops than without them because of the high ate of water infiltration into the soil and the rate of tilization of such water by the cover crops. [See lso *Fld Crop Abstr.* 5 : 937.]—P.J.B.

58 ap GRIFFITH, G. **The interception of rain water by a vegetable mulch.** *Trop. Agric., Trin.* 1952, **29,** Nos. 1-3, 50-3, illus.

ecords kept on estates in Trinidad show that egetable mulches have a drying effect on soils in ome areas of low rainfall. It is suggested that the drying effect may be caused by the interception of rain water by the mulch, followed by the evaporation of the intercepted water. The percentage of rain water intercepted by 6 in. layers of elephant grass (*Pennisetum purpureum*) placed in rain gauges, side by side with empty gauges, was measured over the period January to July, 1951. Over the whole period, 27% of the rainfall failed to penetrate the mulch. The percentage of the rain water intercepted by the mulch decreased with increasing intensity of rainfall. A daily rainfall of less than 0.1 in. failed to penetrate the mulch at all. When the daily rainfall was 0.6 in., about 50% of the water failed to reach the underlying soil. Similar results were obtained when mulches of sugar cane bagasse of varying thicknesses were used.—W.J.B.

759† DEBENHAM, F. **The water problems of Africa.** *J. roy. Soc. Arts* 1952, **100,** No. 4864, 147-58, illus.

The author discusses the problem of water use and conservation in East and Central Africa and the Bechuanaland Protectorate. The study of African water problems is only a preliminary stage to the immense task of turning the Continent from an easy-going subsistence economy into a prime producer and exporter of food.—K.L.

760 IWERSEN, J. Die Pflanze als Helfer in der Landeskultur. [**The plant as helper in the cultivation of land.**] *Z. Acker- u. Pflbau* 1950, **92,** No. 1, 25-47, bibl. 1 in text, illus. [Received 1952]

The subject is discussed with reference to the reclamation of land from the sea or estuaries, in which certain plants can be used to start the process of natural colonization, as in the sowing of *Salicornia herbacea* on mud flats in the Meldorf Bucht, Germany. The following are discussed : plants which can be successfully used on newly reclaimed lands with different degrees of salt concentration and other soil deficiencies ; crop plants for improving degraded, old, river and sea marshes ; and plants for restoring fertility to light sandy soils of poor quality.—G.M.R.

WEEDS AND WEED CONTROL

61† KRUIJNE, A. A. Vegetatieve herkenning van onze akkeronkruiden. [**Identification of our field weeds in the vegetative state.**] *Meded. LandbVoorlDienst* 1952, No. 65, pp. 55, illus.

72 field weeds of the Netherlands can be identi- ed by means of this publication which comprises a ey, in which both scientific and Dutch names are sed, illustrations of vegetative parts of each plant, nd an index.—W.J.B.

762† VAN FRAASSEN, A. M. De kiemplanten der tweezaadlobbige akkeronkruiden (1). [**The seedlings of dicotyledonous field weeds (1).**] *Meded. LandbVoorlDienst* 1952, No. 67, pp. 35, illus.

This publication, which is designed to facilitate the identification of Dutch field weeds in the seedling-stage, is supplementary to Publ. No. 65 [see Abs. 761]. The forty weeds, excluding grasses, considered the most harmful are described in detail with reference to habitat, form of hypocotyl and the first 3-6 leaves. A key and an index are provided.—W.J.B.

763† SEED WORLD PUBLICATIONS. *Seed Tr. Buy. Guide* 1953, **36,** pp. 288.
An extensive, illustrated list is included of weeds considered noxious by the Federal and State Authorities in the USA. A summary of agricultural seed laws of the different States is given.—P.J.B.

764 THAKUR, C. **Effect of MCP on nutgrass.** *Agron. J.* 1952, **44,** No. 11, 589-90. [Cent. Sug. Cane Res. Sta., Pusa, Bihar, India]
The results are given of trials on the control of nutgrass (*Cyperus rotundus*) by means of 0.5, 1, 2, 2.5 and 3% solutions of MCPA applied to nutgrass-infested land at a rate of 100 gal. per ac. Average temperatures during the trials ranged from 85 to 89.5°F. and relative humidity was about 80%. The time taken to kill nutgrass top-growth varied from 15 days following the 0.5% treatment to 7 days following the 3% treatment. Tubers from treated plants failed to germinate when removed from the sprayed plots and planted in untreated soil.—P.J.B.

765† CARILLI, A. Prove di lotta contro il *Cyperus rotundus* L. per mezzo di fumiganti del suolo. [**Trials in controlling *Cyperus rotundus* L. by soil fumigants.**] *Ann. Sper. agr.* 1952, **6,** No. 5, 1161-71, bibl. 10, illus., English summary p. 1170. [Sta. Pat. Veg., Roma]
Attempts, made in 1950, to control *Cyperus rotundus*, which is spreading in southern Italy, by 2,4-D treatment were unsuccessful. Further trials were carried out at Scafati, Salerno, in 1951, to control this weed by soil fumigation with Nemafume (DD) on heavily infested, cultivated soil. Good control was obtained when the fumigant was employed at the rate of 10 hl./ha., particularly when water was applied after treatment. Lower doses of the fumigant gave poor control.—E.B.O.

766† RICHARDSON, J. M. **Weeds of South Australia. Ward's weed** (***Vella annua L***). *J. Dep. Agric. S. Aust.* 1952, **55,** Nos. 11-12, 561-6, illus.
When eaten by stock, *Vella annua* causes serious taint defects in the milk and meat of the animals. Although the weed spreads rapidly, it can be controlled in cereals by low-volume spray applications of the amine form of pure MCPA or 2,4-D at the rate of 0.5 lb. per ac. applied when the crop is 7 to 10 in. high. The ester form of 2,4-D may be used for spraying the weed alone. The weed should be sprayed when in a healthy, non-flowering condition.—K.L.

767† ORCHARD, H. E. **Weeds of South Australia. Wild turnip** (***Brassica tournefortii,* Gouan**). *J. Dep. Agric. S. Aust.* 1952, **56,** No. 1, 11-13, illus.
B. tournefortii is, at all periods of its growth, a serious competitor of cereal crops and pastures. Although normally unpalatable to stock, the young plant growth is often eaten by sheep. Infestations of wild turnip in cereal crops can be controlled by MCPA or 2,4-D sprays at the rate of 4 to 6 oz. pure MCPA or 2,4-D in 7 to 10 gal. of water per acre, applied when the weed is actively growing and the cereal crop is about 6 in. high.—K.L.

768† RICHARDSON, J. M. **Weeds of South Australia. Short-fruited wild turnip** (***Rapistrum rugosum* All.**). *J. Dep. Agric. S. Aust.* 1952, **56,** No. 2, 73-4, illus.
R. rugosum is a troublesome weed mainly of cereal crops, and it may be controlled successfully by low-volume spray applications of from 0.25 to 0.5 lb. per ac. of the amine or sodium salt of pure MCPA or 2,4-D. The spray should be applied when the cereal crop has fully tillered but before the stems begin to joint. The weed may be controlled on non-arable land (other than pastures), by spray applications of 0.05% solutions of 2,4-D or MCPA.—K.L.

769 WATSON, D. J. **Biology of wild oats. Germination and dormancy.** *Rep. Rothamst. Exp. Sta. 1951* Harpenden, 1952, 67-9.
In a glasshouse experiment, wild-oat seeds were sown in farmyard manure and in soil [see Report for 1950, Rothamst. Exp. Sta. p. 66]. In the first season after sowing, a higher proportion of wild oat seeds germinated in farmyard manure than in soil. In the second season after sowing, far fewer seeds (remaining from the first season) germinated in farmyard manure than in the soil. Thus farmyard manure tended to break the dormancy of the seeds in the first season and to reduce germination and the total viability of the seeds in the second season. To find out whether viable seeds can be spread in animal excreta, seeds of *Avena ludoviciana* were fed to a calf bedded on peat. Only a negligible number of wild oat seedlings appeared in the bedding and excreta which were removed and kept in trays in a glasshouse. In field experiments started in October, 1950 to determine the effects of cultivation on the germination of wild oats, *A. fatua* germinated more freely when harrowed into the soil surface, *A. ludoviciana* when buried 6 in. deep. The germination of both types varied from 3 to 15% for different treatments in the first season after sowing. In germination tests at varying temperatures, using whole spikelets, 45-55°F. was found to be the most favourable temperature range for *A. ludoviciana*.—W.J.B.

770 KING, L. J. **Germination and chemical control of the giant foxtail grass.** *Contr. Boyce Thompson Inst.* 1952, **16,** No. 11, 469-87,

bibl. 51, illus. [Boyce Thompson Inst. Pl. Res., Inc., Yonkers 3, N.Y.]

iant foxtail (*Setaria faberii*) has appeared over the st 20 years in a large number of States in the east d middle-west of the USA and is established in e Corn Belt as a serious weed. Laboratory studies ere carried out on the germination of the seed. Petri dishes, seed germination ranged from 20 to 4%. The addition of soil to the filter paper in- eased germination by about 10% in both light d darkness. Seed soaked in 0.5, 1 and 2% solu- ons of KNO_3 and 0.01, 0.1 and 1% sodium iocyanate before being washed and sown in soil ad considerably higher germination percentage an seed not so treated, as had seed subjected to ternating temperatures of 21 to 37°C. and kept moist storage at 21°C. The presence of germina- on inhibitors in the seed was confirmed. Seed in il alternately wetted and dried over an 8-day eriod, had a considerably greater germination ercentage than seed in permanently damp soil ver the same period of time. In soil-treatment sts, the triethanolamine salt of 2,4-D, Crag erbicide [Na 2-(2,4-dichlorophenoxy) ethyl sul- hate], CMU, dichloral urea and chloro IPC were pplied as sprays at rates of 2.5, 5, 10 and 25 lb. er ac. to the surface of soil in pots containing iant foxtail seeds. After 21 days, the pots were ried for 21 days and watered again for a 14-day eriod. Crag Herbicide and 2,4-D at rates of 2.5 nd 5 lb. per ac. caused a 50% reduction in stands uring the first period, compared with the controls. uring the second period of watering, a germina- on range of 6 to 10% was obtained, being similar that of untreated controls. Chloro IPC and di- loral urea at rates of 5, 10 and 25 lb. per ac. com- letely controlled giant foxtail during the first per- d, but were ineffective during the second period. MU gave an effective kill of seedlings at all rates nd also killed emerging seedlings during the second atering period. It is suggested that Crag Herbicide an be used to kill giant foxtail in maize at any me following maize emergence and that dichloral rea at 5 lb. per ac. can be similarly used in well- stablished maize.—P.J.B.

71 Corns, W. G. and Frankton, C. **Hoary cresses in Canada with particular reference to their distribution and control in Alberta.** *Sci. Agric.* 1952, **32,** 484-95, bibl. 34. [Pl. Sci. Dep., Univ. Alberta, Canada]

n account is given of the distribution of *Cardaria aba, C. draba* var. *repens* and *C. pubescens* var. *elon- ata* [*Lepidium* spp.] in Canada and, in particular, Al- erta. *C. draba* is the most widespread of the 3 species; . *pubescens* var. *elongata* shows a preference for lkaline conditions. A review is given of the use nd effectiveness of the following methods for con- olling *Cardaria* spp : (a) sodium chlorate applica- ons, (b) intensive cultivation, (c) alternating fallow with cereal cropping, combined with the use of a selective herbicide on the cereal crop, and (d) sowing down to grass, combined with the use of selective herbicides on the sward. The last method has given the best control.—P.J.B.

772 Feldman, A. W. and Smith, A. E. **Phthalamic acid derivatives for pre-emergence weed control.** *Proc. 5th Southern Weed Conf., 1952* 1952, pp. 12-14, bibl. 9. [Naugatuck Chem. Div., U.S. Rubber Co., Bethany, Conn.]

The results are given of trials in which N-1 naphthyl phthalamic acid and imide were used as pre- and post-emergence sprays for weed control in cotton, soyabeans, fibre flax, maize and beans. 98% of the weeds in the trial plots were broad-leaved, consisting mainly of pigweed (*Amaranthus* spp.), purslane (*Portulaca* sp.), lambsquarters (*Chenopodium* sp.), quickweed (*Galinsoga* sp.) and chickweed (*Stellaria media*). Some crabgrass (*Digitaria* spp.) was also present. In the pre-emergence trials, 5, 10 and 15 lb. of active material in 150 gal. water were applied per ac. in 12 in. bands over the seed drills immediately after sowing. The average percentage weed control in all plots was 92, for a period of at least 4 weeks. The acid formulation gave slightly better weed control than the imide. All the above-mentioned crops tolerated rates of application up to 10 lb. per ac. of both the acid and imide formulations. In post-emergence trials, only beans and cotton were used. Cotton was more tolerant than beans and rates of up to 10 lb. per ac. of either acid or imide formulations caused no damage to either young or old plants. Contact sprays of the acid, or imide, had no effect on young, or established weeds. —P.J.B.

773 Gonggrijp, J. Het gebruik van minerale oliehoudende onkruidbestrijdingsmiddelen in Indonesie. [**The use of aromatic oils and chemical herbicides for weed control in Indonesia.**] *Meded. LandbHogesch., Gent* 1952, **17,** No. 1, 16-27, bibl. 3, English summary p. 27. [Koninklijke/Shell Lab., Amsterdam]

The results are given of trials in Indonesia with aromatic oils and aromatic oils + PCP, or DNOC, for controlling grass weeds, to determine whether these herbicides could replace sodium arsenite for weed control. For resistant species, such as *Imperata cylindrica, Paspalum conjugatum, P. scrobiculatum, Anastropus compressus* and *Cynodon dactylon*, undiluted high-aromatic oil sprays, either with, or without PCP and DNOC, have given good results. For the control of relatively susceptible weed species, 10% emulsions of aromatic oils in water have been effective.—P.J.B.

774 Voevodin, A. V. [**The use of 2,4-D for the suppression of weeds which multiply by their roots.**] [Russian] *Doklady Akad. Nauk SSSR*

(*Proc. Acad. Sci. USSR*) 1952, **84,** No. 1, 113-16, bibl. 6. [All-Union Sci. Res. Inst. Pl. Prot.]

To eradicate weeds by cultural measures it is frequently necessary to till the soil many times. This is especially necessary for those weeds which multiply rapidly by their roots. The replicated trials reported in this work have shown that satisfactory eradication of the weeds *Cirsium arvense*, *C. incanum* and *Convolvulus arvensis* may be achieved by reducing the number of tillage operations and treating the soil with a 2,4-D preparation [not specified].—M.H.

775 RUSSELL, E. W. **Weed control.** *Fm Mechaniz.* 1952, **4,** No. 44, 472-5, illus. [Dep. Agric., Univ. Oxford]

A review is given of the comparative merits, limitations and uses of mechanical and chemical methods for controlling weeds on uncropped land and in growing crops and pastures.—P.J.B.

776† MOORE, R. M. **Review: weeds research in Australia.** *Fung. Insect. Res. Co-ord. Serv. Sect. C. Herbicides* 1952, No. 5, 27-34, bibl. 63. [Div. Pl. Industr. CSIRO, Canberra].

Research on weeds in Australia is co-ordinated through the State Weeds Co-ordination Committee. In this review article, progress on the various problems and the weed control methods used in Australia are briefly discussed. There is increasing evidence that phenoxyacetic acid compounds at low rates of application (2-4 oz./ac.) may enable cereals to compete successfully with a wide range of dicotyledonous weeds. For deep-rooted perennial weeds these compounds seem to be assisted by, and may depend on, the presence of competing plants during the non-arable period. In general, low-volume applications of hormone-like herbicides gave similar results to high volume applications. Oil as a carrier for 2,4,5-T esters in low-volume ground-applications appears less effective than water. Dusts have not been as effective as sprays. The solving of many weed problems is hampered by lack of knowledge of the life histories of the plants concerned.—C.L.S.

CROP BOTANY

777† BERTRAND, G. and BERTRAND, D. Sur la teneur des graines en rubidium (II). [**Rubidium content of seeds (II).**] *C. R. Acad. Agric. Fr.* 1952, **38,** No. 2, 66-8, bibl. 1.

The analysis was undertaken with a view to studying the rubidium content of the seed of the Labiatae, a family omitted from the previous series of analyses [see *Herb. Abstr.* 22 : 504 and *Fld Crop Abstr.* 5 : 594]. The rubidium content of the seed of Labiatae was lower than the average for the seed of all other phanerogams examined, being 5.67 mg./kg. dry matter, as against 9.35 for phanerogams in general.—D.B.

778† ALLEN, S. E. and SKOOG, F. **Stimulation of seedling growth by seed treatments with N-phenyl succinimide derivatives.** *Pl. Physiol.* 1952, **27,** No. 1, 179-83, bibl. 3, illus. [Univ. Wisconsin, Madison]

Growth stimulation by N-2,4-dichlorophenyl succinimide was limited to young seedlings of wheat and radish. The stimulation was more effective on the root than on the shoot. This compound was ineffective on older plants.—D.B.

779 DYKYJ-SAJFERTOVÁ, D. Vliv růstových stimulátorů na enzymy klíčícího semene. 1. Histochemická kontrola dehydráz kyselinou tellurovou a 2, 3, 5-trifenyltetrazoliumchloridem. [**Effect of growth substances on enzymes in germinating seeds. 1. Histochemical control of dehydrase by telluric acid and 2, 3, 5-triphenyltetrazolium chloride.**] *Sborn. čsl. Akad. Zeměd.* (*Ann. Acad. csl. Agric.*) 1952, **25,** No. 4, 317-32, bibl. 29, illus., Russian summary p. 332.

Wheat grain, sunflower seed and beans were included in the material of this study.—M.H.

780 RUBAN, E. L. and DOLGOPOLOV, N. N. [**Concerning the action of ultrasonic (sound-wave) fluctuations on the early phases of development of plants.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1952, **84,** No. 3, 623-6. [Chem. Lab. All-Union Mendeleev Chem. Soc.]

Results of experiments with barley, oats, wheat, maize, peas, beans, cotton and hemp show that the action of ultrasonic fluctuations on the seeds of these species causes marked changes in the physiological processes in the early phases of development of the plants.—R.P.J.

781 AGRONÔMICO, CAMPINAS. O sistema radicular das plantas. [**The root system of plants.**] *Agronômico, Campinas* 1951, **3,** No. 30, 1-3. [Inst. Agron., Campinas]

Tephrosia candida: of the total root weight, 99% was found in the first 50 cm. from the soil surface. The maximum depth reached was 3.85 m. Five-year-old plants grown 35 cm. apart leave in the soil a root weight of 87,022 kg. per alqueire. [1 alqueire in the Brazilian State of São Paulo = 24,200 sq. m.] *Cajanus cajan*: the maximum root-ng depth observed was 2.95 m., but 91% of the total root weight was found in the first 30 cm. Two-year-old plants growing 50 cm. apart furnished the soil with a root weight of 14,968 kg. per alqueire, of which 13,571 kg. were found in the first 30 cm. layer. *Oryza sativa*: two-thirds of the root system were found in the uppermost 5 cm. of the soil, over 95% in the first 15 cm., with the exception of the variety Iguape-catete, which is slightly deeper rooting. The above findings apply to the mixed red earth of Campinas, State of São Paulo, and, in the case of rice, to the behaviour of 5 varieties.—G.M.R.

782 Burström, H. **Studies of growth and metabolism of roots. VIII. Calcium as a growth factor.** *Physiol. Plant.* 1952, **5,** No. 3, 391-402, bibl. 21, illus. [Bot. Lab., Lund Univ., Sweden]

The results are given of studies of the interaction of Ca, H-ions and the anti-auxin, parachlorophenoxy-iso-butyric acid, on root elongation in wheat and barley. Growth/pH curves are given for roots growing in solutions containing different amounts of Ca and at different pH values. The role of calcium as a growth factor is discussed.—P.J.B.

783 Fuller, H. J. and Wilson, S. L. **Root illumination and flowering.** *Science* 1952, **116,** No. 3025, 688-9, bibl. 3, illus. [Bot. Dep., Univ. Illinois, Urbana]

The exposure of roots of *Amaranthus caudatus*, a short-day species, to photoperiodic treatment retarded both the initiation and growth rates of the inflorescences, compared with plants in which the tops, only, were exposed to photoperiodic treatment; the growth rate of the inflorescences decreased as the length of the photoperiods applied to the roots increased.—P.J.B.

784 Oliver, W. F. **Absorption and translocation of phosphorus by foliage.** *Sci. Agric.* 1952, **32,** No. 8, 427-32, bibl. 4, illus. [Macdonald Coll., Quebec, Canada]

Studies were made of the absorption by bean and maize leaves of neutron-irradiated superphosphates. Superphosphate was scattered on the soil round the bean plants immediately before heavy rain, so that the P was splashed onto the foliage. With maize, small amounts of the irradiated superphosphate, in solution, were applied to the leaves. The foliage of both the bean and the maize plants was found to be capable of absorbing the P and translocating it to all parts of the plants. After 20 days, - 20% of the absorbed P had been translocated from the leaves originally treated. The rate of absorption into, and translocation from, old leaves was much lower than that from young leaves. The upper surfaces of leaves were more effective in absorbing P than were the lower surfaces. Maize plants absorbed little P when this was placed on the stems; placing the solutions on the surface of developing leaves led to the highest rate of absorption. From these results, it appears that the P content of beans and maize may be increased by foliage sprays containing P and that the best time for such treatment is when the plants are growing rapidly.—P.J.B.

785† Shaw, E. **A dithizone tissue test for zinc in plants.** *Soil Sci.* 1952, **74,** No. 6, 479-80, bibl. 2. [U.S. Dep. Agric.]

Three items of evidence are presented to show that a proposed dithizone test for Zn may offer a rapid method of assessing the relative Zn content of plants and also differences in the Zn concentration in different parts of a given plant.—P.J.B.

786† Schrenk, W. G. **Application of emission spectroscopy to agricultural problems.** *Trans. Kans. Acad. Sci.* 1950, **53,** 229-34, bibl. 35. [Received 1953] [Kansas Agric. Exp. Sta., Manhattan]

The results are given of studies on the use of emission spectroscopy for analysing plant material for micronutrients.—P.J.B.

787 Farm Chemicals. **Terramycin as a plant stimulant.** *Fm Chem.* 1952, **115,** No. 12, 12-13, illus.

A note is given on greenhouse experiments with sweet corn grown with and without terramycin in 2 flats. During a 4-day period, one flat received daily amounts of 1 l. water and the other, 1 l. of water + 5 ppm. terramycin. Afterwards the plants in both flats were given water only, as required. After 4 weeks from the time of the 4-day treatment [growth stage not stated], the above-ground parts of the plants receiving water only, averaged 14 in. in height and weighed 2.4 g. on a dry-matter basis. The plants receiving terramycin averaged 17.45 in. in height and weighed 5.1 g. on a dry-matter basis. In other trials, penicillin has also been shown to have growth-promoting properties.—P.J.B.

788 Petersen, H. L. Krydsningsfaren inden for Brassicaslaegten og forholdsregler mod krydsning. [**The danger of crossing between *Brassica* species and the regulations concerning crossing.**] *Dansk Frøavl* 1952, **35,** No. 9, 117-21, illus.

An account is given of the appearance of undesirable hybrids of *Brassica* spp. produced fortuitously. A diagram is given of the respective liability to crossing between different *Brassica* spp. The present regulations in force in Denmark for dealing with the problem are discussed.—P.J.B.

789 Oleĭnikova, T. V. [**Concerning the phasic development of biennial root crops.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc.

Acad. Sci. USSR) 1952, **85,** No. 3, 657-60, bibl. 12. [All-Union Inst. Pl. Industr.]

Experiments with turnips and swedes are reported. The weak reaction to day length of plants grown from roots taken from storage in the spring and the strong reaction of vernalized seedlings of the same varieties support Abakjan's theory regarding the significance of metabolism during the passing of phases of development. Plants grown from roots have a store of nutrients and so can pass through the light phase even under unfavourable light conditions. A vernalized seedling, having no store of nutrients, reacts sharply to an alteration in the length of illumination.—R.P.J.

790† GLEASON, H. A. **Some fundamental concepts in taxonomy.** *Phytologia* 1952, **4,** No. 1, 1-20.

The concepts of population, kind, category and classification are discussed.—D.B.

MISCELLANEOUS

791 BERKNER,—Die Beziehungen zwischen Pflanzenbau und Witterungsablauf. [**The connexion between crop-growing and the weather.**] *Z. Acker- u. Pflbau* 1950, **93,** No. 1, 22-32.

Daily records of mean temperature and rainfall, kept during 1921-44 on an estate in Silesia, are compared with the estate's records of crop yields during the same period. The crops grown were winter barley, rye, winter wheat, summer wheat, summer barley, oats, potatoes, fodder- and sugar-beet. The principal crop was sugar-beet, and information is given on the percentage of sugar and the sugar yield obtained. Conclusions are reached concerning the climatic requirements of the different crops.—G.M.R.

792† SCHNELLE, F. Klima und Witterung in ihrer Auswirkung auf die Qualität pflanzlicher Erzeugnisse. [**Climate and weather and its effect on the quality of plants.**] *Landw. Forsch.* 1952, Sonderheft **2,** 51-60, bibl. 33. [Deutscher Wetterdienst. Zentralamt, Bad Kissingen, U.S.-Zone, Germany].

793† POHJAKALLIO, O. Suomen paikallisissa lannoituskokeissa esiintyneiden huippusatojen jakautuneisuus eri leveyspiireille. **On the appearance of the peak yields of cultivated plants at different latitudes in Finland.** *Maataloust. Aikakausk.* 1952, **24,** No. 3, 119-23, bibl. 17, illus., English summary p. 123. [Inst. Pl. Path., Univ. Helsinki]

The fertilizing experiments reported indicate that peak yields, i.e. the air-dry yields of the herbage plants, green fodder, and summer cereals (grain + straws) exceeding 10,000 kg. and the tuber yields of potatoes exceeding 40,000 kg. per ha. occur in the most northerly regions of Finland. These results support the opinion that the amount of light in the summer months of North Finland suffices to give about equally abundant photosynthetic production as the south of the country. The light conditions in Lapland do not prevent plant cultivation from being an economic proposition when the cultivation is limited to those plants for which the period of growth is not too short. On the contrary, no special effect of the uninterrupted daylight which would suffice to compensate for the shortness of the period of growth has been established from the appearance of the peak yields at the different latitudes in Finland. [See also Abs. 587.]—From author's summary.

794† HAAGEN-SMIT, A. J. and others. **Investigation on injury to plants from air pollution in the Los Angeles area.** *Pl. Physiol.* 1952, **27,** No. 1, 18-34, bibl. 12, illus. [Calif. Inst. Technol., Pasadena ; Univ. Calif., Riverside ; and Los Angeles County Air Pollut. Control District]

Smog (the combination of fog and smoke characteristic of the Los Angeles district) causes a metallic sheen to develop on the under surface of the leaves of spinach and sugar-beet and causes small necrotic spots and bleaching of the leaves of oats and lucerne. Since similar injury is not caused by the known air pollutants, the nature of the injurious substances was jointly investigated by three organizations (see addresses above). The investigations have shown that hydrocarbons, which are normally harmless air pollutants, can cause severe damage through their reaction with other substances in the air.—D.B.

795† CZECH, M. and NOTHDURFT, W. Untersuchungen über Schädigungen landwirtschaftlicher und gärtnerischer Kulturpflanzen durch Chlor-, Nitrose- und Schwefeldioxydgase. [**Damage to agricultural and garden plants by chlorine, nitrogen peroxide and sulphur dioxide.**] *Landw. Forsch.* 1952. **4,** No. 1, 1-36, illus. [Farbwerke Hoechst A. G. Germany]

Laboratory and field experiments were carried out on various plants including winter rape (*Brassica napus oleifera* subvar. *biennis*), winter wheat, winter rye, winter barley, oats, peas, sugar-beet, early potatoes and lucerne. The results obtained with different concentrations of the gases at varying periods after treatment have been tabulated.

oloured photographs illustrate the effect of the ases on the plants. An attempt has been made to etermine the toxic and the lethal dose.—D.B.

96† Wassink, E. C. and van der Scheer, C. **A spherical radiation meter.** *Meded. Landb-Hogesch., Wageningen* 1951, **51,** No. 9, 175-83, bibl. 12, illus. [Pl. Physiol. Lab., C.I.L.O. Wageningen]

n account is given of the design and operating haracteristics of a spherical, photo-electric radiaion meter. Its chief advantage appears to be in its se for determining the amount of light influx into given space, such as a greenhouse, or for determing the amount of irradiation received by plants ith a vertical growth habit.—P.J.B.

97 Daulton, R. A. C. and Stokes, W. M. **The destruction or inhibition of root-knot nematodes by exposure to an electrostatic field.** *Emp. J. exp. Agric.* 1952, **20,** No. 80, 271-3. [Tobacco Res. Bd. Sta., Trelawney, S. Rhodesia, (R.A.C.D.) and Rhod. Tobacco Ass. Mech. Res. Scheme, Rusape, S. Rhodesia, (W.M.S.)]

xperiments are described in which root-knot ematodes [*Meloidogyne* spp.] were destroyed in ry soil, damp soil and water by subjecting them to pulsating electrostatic field set up by a simple nduction soil across suitably spaced electrodes. he equipment, requiring less than 1 h. p. as a rime mover, and driven from the power take-off f a tractor, destroyed nematodes in the soil to a epth of 24 in. over a track-width of 36 in. This lectrical treatment applied to growing tobacco lants resulted in no permanent detrimental effects nd in all cases the treated plants continued to row normally and matured at the same time as ther non-treated plants.—K.L.

98 Cockbill, G. F. **The root knot eelworm** [***Meloidogyne* spp.**]. *Rhod. agric. J.* 1952, **49,** No. 5, 303-12, bibl. 10, illus.

99 Bonnemaison, L. Essais de traitements du sol et des semences contre les larves de taupins. [**Soil and seed treatment in the control of wireworm.**] *C. R. Acad. Agric. Fr.* 1952, **38,** No. 4, 164-7, bibl. 6.

reatment of the soil with insecticide is preferred hen the wireworm population is high, i.e., exceeding 750,000 per ha.—it is claimed as the only eans of combating wireworm in the potato crop. period of 18 months or 2 years should elapse efore root or tuber crops are grown in soil treated ith BHC or its derivatives because of the flavour imparts to vegetables. Treatment of seed with nsecticide is recommended when the wireworm opulation is small i.e. less than 500,000 per ha. dry application of insecticide is preferable to a oist one.—D.B.

800† Jenkins, C. F. H. **Insect pests and their control. The red-legged earth mite (*Halotydaeus destructor* (Tucker)).** *J. Dep. Agric. W. Aust.* 1952, **1,** (N.S.), No. 4, 509-12, illus.

A general description of the life history and habits of this mite are given. It causes damage to leguminous crops and occasionally it attacks linseed and cereals. Control measures include : (a) The use of clean fallowed land for susceptible crops. Where fallowing is impossible, weedy land should be turned in as long as possible before planting. Burning may assist in reducing mite numbers. (b) Chemical control by dusting or spraying with DDT at the rate of 0.5 lb. per acre.—K.L.

801† Joubert, C. J. **Earth fleas and black sandmites.** *Fmg in S. Afr.* 1952, **27,** No. 320, 492. [Stellenbosch-Elsenberg Agric. Coll.]

Several plants including potatoes, beans, peas, winter grain crops, lucerne, clover and pasture grasses are attacked by these pests [scientific names not given]. Effective control measures against sandmites include : (a) cultivation of the soil at the right time ; (b) the removal or ploughing in of all crop residues including hedge-row grass, etc. after harvest ; (c) cereals or pastures in the seedling stage may be treated with Bexadust or other BHC dusts at 15 lb. per morgen (1 morgen = 2.1165 ac.). BHC applications are not recommended for well-developed pastures or food crops ; (d) food crops may be sprayed with either 40% nicotine sulphate (1 pt. in 80 gal. water plus 4 lb. soap) or 1 gal. of 25% DDT emulsion in 250 gal. water ; (e) food crops may also be treated with 4% nicotine powder or 5% DDT dust at 20 lb. per morgen.—K.L.

802 Scheffer, F. and others. Untersuchungen über den Einfluss von Pflanzenschutzmitteln auf Boden und Pflanze. [**The influence of plant-protection agents on soil and plants.**] *Z. PflErnähr. Dung.* 1952, **56,** No. 1-3, 151-71, bibl. 62, illus. [Univ. Göttingen, Germany]

The action of HCC (hexachlorocyclohexane), DDT (pp'dichlorodiphenyl-trichlorethane), E 605 (diethyl-p-nitrophenyl monothiophosphate), and U 46 (sodium dichlorophenyloxyacetate) has been summarized as follows. HCC had no effect on the bacterial content of the soil until its concentration reached 625 kg. per ha. and it allowed oats, lupin, rape and mustard to develop normally when in concentrations below 3660 kg. per ha. DDT increased the bacterial content of the soil, which in turn resulted in a better growth of oats, rape and mustard, but not of lupin. E 605 dust, at 10 to 50 kg. per ha., increased the bacterial content of the soil ; up to 12,000 kg. per ha. there was no damage to mustard, rye, oats or rape, but the yield of lupin was halved. U 46 had no effect on the bacterial content of the soil, and with the normal dose [not stated] yields of oats and its following crop, lupin, were not reduced. The effect of U 46 disappears from the soil so completely within 5 weeks that red clover can be grown.—D.B.

803 Jensen, H. L. and Petersen, H. I. **Decomposition of hormone herbicides by bacteria.** *Acta Agric. scand.* 1952, **2,** No. 3, 215-31, bibl. 18, illus. [State Weed Res. Dep., Lyngby, Denmark]

A condensed version of this paper was reviewed in Abs. 534.—P.J.B.

804 Kozlova, E. N. and Dvorcova, E. I. [**The toxicity of plants caused by organic insecticides.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* (*Proc. Lenin Acad. Agric. Sci.*) 1952, **17,** No. 4, 18-24, bibl. in text. [All-Union Sci. Res. Inst. Pl. Protect.]

Investigations are reported in which the experimental material included maize (*Zea mays*), beet (*Beta vulgaris*) and cotton (*Gossypium* sp.). The experiments indicated that the use of organic insecticides to render plants toxic to insect pests leads at the same time to an intensification of the growth processes of the plants.—R.P.J.

805 Plant Disease Reporter. **1951 summary of results of fungicide tests in the United States and Canada.** *Pl. Dis. Reptr* Suppl. 1952, 213, pp. 140.

806 West of Scotland College of Agriculture. Economics Department. Rep. No. 1. **Crop costs 1951.** 1952, pp. 18. [Glasgow]

This report presents a statistical summary of the crop costings of 12 bean crops, 19 early potato crops, 6 arable-silage crops and 12 hay crops.—K.L.

807 Elliott, F. C. and others. **Uniformity trials with spring wheat.** *Agron. J.* 1952, **44,** No. 10, 524-8, bibl. 9. [Wash. Agric. Exp. Sta., Pullman]

Results are given of uniformity trials carried out with Marfed spring wheat in Washington during 1949 and 1950, to compare the effectiveness of different sizes and shapes of plots and the relative efficiency of different plot arrangments.—P.J.B.

808† Oakland, G. B. **Sign and rank tests.** *Sci. Agric.* 1952, **32,** No. 12, 663-9, bibl. 8. [State Res. Serv. Unit, Sci. Serv., Canad. Dep. Agric., Ottawa]

A review is given of sign and rank tests for the rapid estimation of the significance of experimental results. Included are rank tests for the comparison of 2 means, or any number of groups, sign tests for trends and for grouping in trends, rank correlation and a corner test for correlation.—P.J.B.

809† Tweedsmuir, J. and others. **Report of the Committee of Enquiry into the Imperial Institute.** 1952, pp. 38, London ; HMSO, 1s. 6d.

A Committee of Enquiry was appointed by the Minister of Education in October, 1950, to advise him on the aims, constitution, activities, premises and finance of the Imperial Institute, London. The Committee concludes that the aims and organization of the Imperial Institute need drastic revision and that the emphasis should shift from economic to social and cultural interests. They consider that the Institute's most important functions would be to act as a Commonwealth forum and to provide facilities for the presentation and exchange of ideas and information amongst the Commonwealth member countries. To mark this change of outook it is recommended that the name be changed to Commonwealth Institute. A summary of the Committee's conclusions and recommendations are given on pp. 24-5.—C.L.S.

810† Antropov, V. I. [**The Priekuli State Breeding Station. (Results of 5 years' work.)**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1951, **18,** No. 2, 26-32.

The Station is situated in the Latvian SSR. It was destroyed during the war, but restored in 1945. Data are given of yields (including grain and hay harvests) obtained in the subsequent 5-year period with new varieties of wheat, buckwheat, oats, rye, barley and potato. Agrotechnical problems are also discussed.—M.H.

811† Jarmizin, D. V. [**Selection and experimental work in the Kirgiz State Breeding Station.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 9, 33-40.

This Station was founded in 1937. It lies in the foothill region of the Čuisk Valley on light chestnut soils. There is great diversity in the soils and climate of the Kirgiz Republic which is divisible into 18 zones. The work of the Station is supported by 4 experimental centres located : (1) in the Issyk-Kulj ravine at 1800 m. where irrigation farming is practised ; (2) in the Tjanj-Šanj, at 2000 m., also with irrigation ; (3) in south Kirgiz where the climate is dry and hot and there is a predominance of non-irrigated areas; (4) in the Čuisk Valley where there is the largest area under both dry farming and irrigation. Breeding work at the Station is concerned primarily with cereals, but flax, herbage grasses and legumes are also included. Information is supplied on varietal trials and on cultivation methods.—M.H.

812† Šakirjjanov, S. Š. [**20 years' work of the Kamalinsk State Breeding Station.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 11, 37-40.

his Station, formerly the Eastern Siberian Re-
ional Station for Grain Crops, was established in
he Kansk Forest/Steppe, Krasnojarsk Territory,
pprox. 55°N. lat., 95°E. long.] in 1931. At the
nd of 1931, the Plant Breeding Department of the
gricultural Experiment Station, Prieniseĭsk Pro-
ince, and also the Agronomy Department of the
xperiment Station, Irkutsk Province, were trans-
erred to the Kamalinsk centre. Research is now
oncerned primarily with problems of introducing
ley system of farming suitable for the local con-
itions. Regionalized varieties of crops produced
y the Station cover about 100,000 ha. in fields of
e collective and State farms in the Krasnojarsk
erritory and neighbouring provinces. The var-
ties include : spring wheat Leda A-47 (adapted
Buriat-Mongolia ASSR) ; Vydviženec 194 oat
n Kemerovsk, Novosibirsk and Tomsk Provinces);
amalinsk 930 lucerne (in Irkutsk Province). The
ork of producing stocks of elite seed is outlined.—
.H.

813 UNESCO. **Handbook on the international exchange of publications.** 1950, pp. 369. [Received 1952]

The first part of this publication summarizes the history of international publication exchange and lists the different governmental exchange bureaux, the exchange arrangements in force between countries and the texts of the relevant contracts entered into between governments. The second part lists the official bibliographies published by different countries and the institutions, with their publications, which participate, or are prepared to participate in publication exchange.—P.J.B.

814 UNESCO. **List of scientific and technical journals published in South-East Asia (Philippines, Indonesia, Malaya, Thailand, Indo-China, Hong Kong).** Revised edition. 1951, pp. xiii + 32, Manila ; UNESCO Sci. Co-op. Office E. Asia.

BOOKS AND REPORTS

BOOKS

.5 SHAW, B. T. (Ed.) **Soil physical conditions and plant growth. Agronomy.** 1952, **2,** pp. 491, bibl. at end of each chapter, illus., New York ; Academic Press Inc., 23 × 14 cm., 70s. 6d.

6† SMITH, A. M. **Manures and fertilizers.** 1952, pp. xii + 275, bibl. 11, pl., London ; Nelson and Sons, Ltd., 19 × 13 cm., 15s.

his book is written for the grower who is con-
rned with maintaining or improving the produc-
ivity of his soil, and for the student who is inter-
ted in the many factors involved in the process
plant nutrition.—C. L. Skidmore.

7† NORMAN, A. G. (Ed.) **Advances in agronomy.** 1951, **3,** pp. x + 361, New York ; Academic Press Inc., 23 × 14 cm., 68s. 0d.

his work has been compiled on the same pattern
the earlier issues [see *Herb. Abstr.* 22 : 323, 324].
e following subjects are included : the manage-
ent of alfalfa meadows, by C. J. Willard ; the
anging pattern of agriculture in England and
ales, by J. A. McMillan ; the adaptability and
eeding of suitable grasses for the south-eastern
SA, by G. W. Burton ; chemical treatment of the
il for nematode control, by A. L. Taylor ; pro-
ems and progress of soil conservation in the
SA, by H. J. Harper ; irrigation, agriculture and
il research in the USA, by R. O. Parks.—M. Hall.

818† PLANT PROTECTION, LTD. **Common farm weeds illustrated.** 1952, pp. 172, illus., London ; Butterworths Scientific Publications, 14 × 23 cm., 15s.

This book is a handy means of reference for farmers and others concerned with practical weed control problems. It is divided into arable and grassland sections, which contain 49 and 30 weed species, respectively. Photographs show each species at early and mature growth stages and notes are given on common names, growth habit, distribution in Britain, points of recognition and on the morphology of leaves, flowers and stems. The illustrations are clear and show all relevant features. For the farmer, additional notes on the relative importance of the species as weeds, their control and other points of significance to him would have been welcome. For the student and research worker, it constitutes a useful source of quick reference and identification.—P. J. Boyle.

819† HAIGH, J. C. and others. **A manual on the weeds of the major crops of Ceylon.** 1951, pp. 106, illus., Colombo ; Dep. Agric., Ceylon, 26 × 19 cm., 5 rupees. [Received 1952]

The agriculturalist in Ceylon is, for the first time, provided with an authoritative handbook describing the weeds of his major crops : tea, rubber, and coconut. The manual is the work of a Committee formed in 1937 whose members represented the Ministry of Agriculture and the Tea, Rubber and Coconut Research Schemes. Fifty of the commoner weeds are described and arranged in alphabetical order by botanical names. A page is allocated to the description of each, adequate space being left for personal notes. Although there are notes on physical methods of weed control there is no mention of chemical control. Colour plates illustrate each weed. In order that all the commoner weeds may eventually be included in the manual it is proposed to publish additions from time to time. The manual is bound in loose-leaf form so that these additions may be interposed in alphabetical order. A key, which would be of great value to the scientific worker anxious to identify a particular weed, is notably absent from the present work. It is proposed to publish a key at a later date.—W. J. Baulkwill.

820 Gram, E. and Bovien, P. Hilleshög Brochure No. 10. Maladies et affections parasitaires de la betterave à sucre. [**Diseases and pests of sugar-beet.**] 1952, pp. 68, illus., Amsterdam ; N. V. Hollandsch Zweedsche Zaad Maatschappij, 16 × 21 cm. [Received 1953]

This booklet contains concise accounts of the causes and symptoms of sugar-beet diseases and of the visible signs in the plant of damage by pests or weather. The pests themselves and the disease vectors are described. The coloured illustrations of diseased and damaged plants and of insect pests are of special value for the field diagnosis of sugar-beet ailments. There is a tabulated index under the headings of symptoms, season and name of disease or pest.—W. J. Baulkwill.

821 Snowdon, J. D. **The cultivated races of sorghum.** 1936, pp. vii + 274, bibl. 489, London; Trustees of Bentham-Moxon Fund, 25 × 15 cm., 10s. 6d. [Reviewed in *Herb. Abstr.* 6, p. 463.]

The importance of this extremely large group of tropical cereals as a source of food for man and beast is now widely recognized by agriculturalists and others dealing with world food shortages. Over large areas of Africa and tropical Asia the grains of these plants form an important part of the diet of the natives, whilst elsewhere, especially in America and parts of Australia, they are used extensively as food for domestic animals. There are many thousand of local varieties, differing much in structure, yield and growth requirements. Their identification is difficult. It is not generally known, however, that a comprehensive survey of them was undertaken about 20 years ago, when, as the result of an appeal issued in the British Commonwealth and in many other countries, several thousand flowering and fruiting heads, together with much valuable data concerning them, were received at Kew. This material was utilized in the preparation of the book entitled *The Cultivated Races of Sorghum* by J. D. Snowden, at one time Economic Botanist in the Uganda Protectorate. In its 274 pages this book includes not only a classification and descriptive account of the 31 botanical races and of their numerous varieties and forms, but also detailed information on their distribution, culture and economics, together with an extensive bibliography of 12 pages, indices of botanical and vernacular names, and numerous illustrations. It is a work which should be in the libraries of all agricultural officers dealing with tropical field crops, and of everyone generally interested in economic botany. Copies, in paper covers, are still available from the Bentham-Moxon Trustees, Royal Botanic Gardens, Kew, Richmond, Surrey, at the price of 10s. 6d., postage extra.

822 Hill, A. F. **Economic botany. A textbook of useful plants and plant products.** 2nd edn. 1952, pp. xii + 560, bibl. 105, illus., New York [Toronto and London] ; McGraw Hill Book Co., Inc., 23 × 15 cm., 59s. 6d. or $7.00.

Since the second World War great attention has been given to food crops, shortages of which are reflected in the rationing of food and, in some countries, in famines. Botanists, agriculturalists, economists and politicians have been studying means for increasing crop productivity and one result has been the publication of many new books, or the revision of former ones, on various aspects of plant science. Among books having direct bearing on the economics of nutrition is the new edition of *Economic Botany* by A. F. Hill of Harvard University. The first edition appeared in 1937, since when much progress has been made in the study of plants in their relation to man's needs, as indicated by important additions and alterations incorporated in the present edition. This *Textbook of Useful Plants and Plant Products* [its alternative title] covers a wide field, and is a compendium of present information on the subject. There is a useful bibliography for those who want to make further study of special aspects of the science but it should be noted that there are no references earlier than 1936. The author naturally deals especially with North American crops but his book should be helpful to economists in all countries where crop plants are cultivated.

In this edition, many species which are important in Latin America have been included and the introduction of new tropical crops into South America and the development of new types of tropical agriculture in the Old World are emphasized.

After a chapter on the importance and nature of plant products, descriptions are given of industrial plants (including fibre plants), drug plants, food plants and food adjuncts. The section on food plants occupies rather more than a quarter of the book and includes descriptions of forage and field crops in the chapters on the major cereals and he minor cereals and small grains. Some plants are ery briefly mentioned [the potato occupies less han three pages, the tomato one page], but their utritive properties and relative importance in the vorld's food supplies are indicated.

As a concise encyclopedia of plants which are f service to man, this book can be highly recomnended.—H. Wormald.

23 Abrams, L. **Illustrated flora of the Pacific States. Vol. III. Geraniaceae to Scrophulariaceae. Geraniums to figworts.** 1951, pp. viii + 866, bibl. in text, illus., California ; Stanford Univ. Press : London ; Oxford Univ. Press, 27 × 20 cm., $17.50.

'rofessor Leroy Abram's illustrated flora of the tates of Washington, Oregon and California must e an indispensable possession of any student of he western American range lands, for it enables im to identify every species of fern, grass, forb, rowse plant and tree indigenous in these three tates. A detailed taxonomic description, either y the author or by collaborators, is given of each pecies ; line drawings show with admirable clearess the characters necessary for identification ; nd data on distribution are appended. Vols. I nd II, which have already appeared [See *Herb. bstr.* 15 : 1157] cover the ferns to the birthworts nd the buckwheats to *Krameria*, respectively. The resent volume deals with the Geraniaceae to the crophulariaceae and includes such families as the axes (*Linum usitatissimum*, naturalized from urope, is widely spread along the regional roaddes), the mallows, the Cactaceae, the dodders 6 spp.) and the potato family. Vol. IV, now in reparation, will complete the work.—G. M. Roseeare.

24† Løddesøl, A. Myreneinaeringslivetstjeneste. [**Peat bogs in the economic life** (**of Norway**).] 1948, pp. 330, bibl. 276, illus., Oslo ; Grøndahl and Sons, Forlag., 23 × 16 cm. [Received 1952]

he importance of peat cultivation in Norwegian griculture can be seen from the fact that some 15% f the total cultivated area consists of peat and bog ils ; also, it is estimated that one-third of the nd cleared for agricultural purposes in future will e of this type. This book, the work of the Director f the Norwegian Peat Society, constitutes a manyded review of the utilization of peat and bog soils nd peat products in Norway. It is divided into six ain sections, covering statistics, the cultivation of eat and bog soils, forestry on peat soils, the peat el industry and the use of peat and peat products s industrial materials. Among the topics dealt ith in the section on the cultivation of peat and og soils, are the factors to be taken into account hen using peat areas for cultivation, the agriculral uses of different types of peat bogs, the question of frost incidence and damage to crops growing on such areas in Norway and the suitability of different crops for peat soils.—P. J. Boyle.

825† Richards, P. W. **The tropical rain forest. An ecological study.** 1952, pp. 450, bibl. 478, illus., Cambridge ; Cambridge University Press, 25 × 17 cm. [Received 1953]

The last three chapters of this book, entitled, respectively " Rain forest, deciduous forest and savanna" ; " the tropical rain forest at its altitudinal and latitudinal limits", and " secondary and deflected successions", are of special interest to the tropical agriculturalist. The last chapter contains an account of the effect of shifting cultivations of varying types and duration on the botanical composition of the rain forests of Nigeria, the Congo, South-east Asia, America and the West Indies. There is a comprehensive bibliography and an index of plant names.—W. J. Baulkwill.

826† Evans, J. W. **The injurious insects of the British Commonwealth (except the British Isles, India and Pakistan).** 1952, pp. vii + 242, London ; Commonw. Inst. Ent., 25 × 17 cm., 30s.

The work is in five parts and information is included on : the environmental conditions and principal crops of each country in the Commonwealth, together with titles of comprehensive publications and a list of the more important insect pests of plants ; the more important plant pests and their distribution, listed under the crops arranged in alphabetical order ; weed control by insects and plant quarantine.

827† Rodgers, A. D. **Erwin Frink Smith. A story of North American plant pathology.** 1952, illus., Philadelphia ; American Philosophical Society, 23 × 16 cm., $5 or 32s. 0d.

REPORTS

The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated.

828 **Rothamsted** Experimental Station. Report for 1951. Harpenden, 1952, pp. 211, 7s. 6d.

Investigations reported :

1. The effect of depth of ploughing and fertilizer placement on potatoes, sugar-beet and wheat, pp. 28-9. Potato crops did not benefit significantly from deep ploughing over the several years of the experiment. In 1951, the yield of potatoes from deep-ploughed (12-14 in.) soil was significantly lower than the yield from shallow-ploughed (6-8 in.)

soil regardless of the method of applying the fertilizer. Ploughing in of fertilizers gave significantly lower yields of potatoes than applying the fertilizer in the bouts. Sugar-beet on deep-ploughed plots in 1951 yielded 34 cwt. of sugar per ac. compared with 29.5 cwt. per ac. on shallow-ploughed plots. In 6 out of 8 years, deep ploughing has caused a slight increase in the yield of sugar. Wheat did not benefit from deep ploughing. In general, deep ploughing before sugar-beet and potatoes did not benefit succeeding crops.

2. Irrigation experiments with sugar-beet, barley and potatoes, pp. 29-30. Data on the effects of irrigation using the overhead spray system on all 3 crops are tabulated under the headings : period and amount of irrigation, rainfall during the period, manurial treatment and yield. All crops benefited to some extent from additional water. The yield of early potatoes with a single nitrogenous dressing was 3.9 tons per ac. when unirrigated, and 7.7 tons per ac. when irrigated. It was not possible to supply water at the full rate before the end of July.

3. Methods of applying manures to peas and beans, p. 37. Crops of peas for threshing, green peas, winter and spring beans were given, in the period 1947-51, the following 4 manurial treatments : (a) no manure, (b) manure broadcast early and worked in deeply, (c) manure broadcast and harrowed into the seed-bed, (d) manure placed in a band 2 inches to the side of the seed and 3 inches below the soil surface. The same quantity of granular PK manure was used in all cases. In 1951 (b) gave a much higher yield of green peas than (c), while there was little difference between the effects of (b) and (c) on bean crops. Peas for threshing, green peas and winter beans (but not spring beans) all benefited appreciably in 1951 from (d). On the average over the 4 seasons 1947-51, placing the manures gave higher yields than broadcasting in the case of all crops. The use of special placement drills is recommended for the manuring of peas and beans and, where such drills are not available, it is suggested that farmers should broadcast manures before cultivating to prepare the seed-bed.

4. The effect of different methods of fertilizer placement on the yield of potatoes, pp. 38-9. Experiments were carried out in 1951 at 14 centres using a simple potato planter with a fertilizer attachment to determine the effects on the yield of potatoes of the following five methods of applying fertilizers : (a) broadcast on the seed-bed immediately before planting, (b) placed in front of the seed-shoe of the planter, (c) placed in contact with the seed, (d) placed in one band beside and below the level of the seed, (e) half the dressing broadcast and half placed in contact with the seed. The fertilizer, National Compound No. 1 (7%N, 7% P_2O_5, 10.5% K_2O) was applied [according to information received from Rothamsted] at two rates, 5.8 and 14.1 cwt. per ac. Methods (c), (d) and (e) all gave yields far superior to those given by methods (a) and (b). The last two methods gave similar results. Placing the manure in contact with the seed (c) gave the highest yields of all. Placing the manure in a band near the seed (d) gave results only slightly inferior to contact placement. Placing half the manure in contact with the seed and broadcasting the remainder (e) was somewhat less effective than method (c). Although method (c) was the most effective in this experiment the placement of heavy dressings of manure in contact with the seed is not generally recommended until the results of further experiments are known, since, in some cases, contact-placement of manure checked the emergence and early growth of the potatoes. In the meantime growers are recommended to use either method (d) or method (e).

5. The uptake of nutrients from solutions sprayed on leaves of sugar-beet, pp. 63-65. [See Abs. 633.]

6. Germination and dormancy of wild oats, pp. 67-8. [See Abs. 769.]

7. Diagnostic value of seed characters of wild oats, p. 69.

8. Distribution of *Avena fatua* and *A. ludoviciana* in England and Wales, p. 69.

9. Chemical control of wireworm, p. 106. Good control of wireworm was obtained with Gammexane 3.5% dust broadcast at 2 cwt. per ac. or combine drilled at 0.75 cwt. per ac. and with ethylene dibromide injected at 15 gal. per ac. 5% DDT dust was less effective but had a good residual effect. The wireworm populations of plots injected with DD at 400 lb. per ac. and those in which seed was treated with Gammexane differed little from the control plots.

10. The toxicity of plant protective chemicals to bees, p. 124. Laboratory estimates are given of the toxicity to bees of Aldrin, Chlordane and Toxaphene. The low toxicity of Toxaphene is noteworthy.

11. The effect of Aldrin and Chlordane on wireworm, p. 125. Yields of wheat from treated plots indicated that the effects of Aldrin and Chlordane on wireworms are similar to that of BHC.

12. The application of dung and fertilizers to potatoes, pp. 132-3. The first 5 tons of dung increased yields by 1.7 tons. Further increments gave smaller increases. The response to sulphate of ammonia was greater in the presence than in the absence of dung. Dung, especially in heavy applications, reduced the response to superphosphate and potash. Dung applied in the ridge gave bigger increases in yield than equal amounts ploughed in during winter or spring.

13. Methods of planting potatoes, p. 133. The effects on yield of hand planting and of deep and shallow mechanical planting were studied. On the average, machine-planted plots yielded 2 tons per acre more than hand-planted plots. Shallow planting gave higher yields than deep planting.

4. Late nitrogenous top-dressing on wheat, barley and oats, pp. 134-5. Late dressings of nitro-chalk were applied to wheat, barley and oats (which had lready received basal dressings) when the plants were coming into ear. On the whole, the late top-dressings were effective on barley, and to a lesser xtent on oats, but had little effect on a heavy crop of wheat. The results are tabulated showing the effects of no top-dressing and of top-dressings of 1.5 and 3 cwt. per ac. of nitro-chalk on the total yields, yields of crude protein and nitrogen contents of grain and straw.
15. An eighteen-year experiment on ploughing in straw and compost, pp. 135-40. [See Abs. 746.]
16. Beet-yellows virus and other yellowing virus diseases of sugar-beet. By M. A. Watson, pp. 157-67.—W.J.B.

829 **Netherlands.** Verslag van het Centraal Instituut voor Landbouwkundig Onderzoek over 1951. [Report of the Central Institute for Agricultural Research during 1951.] Wageningen, 1952, pp. 173, English summaries.

INVESTIGATIONS REPORTED :
1. The rhythm of development of a weed community on arable land. By K. J. Zandstra and D. M. de Vries, pp. 34-9. The results are given of botanical analyses of the weed population and studies of the periodicity of different weed species in a rye field on sandy soil near Wageningen.
2. Observations of the growth of cereals during the winter season. By W. H. van Dobben, pp. 90-101.
3. Results of varietal trials with fibre flax and factors that influence fibre yield and quality. By J. C. Friederich, pp. 105. In trials with a number of varieties in 1951, Wiera gave the highest fibre yields, had good straw stiffness and good resistance to the common flax diseases. Seed treatment with TMTD gave much better results than did organo-mercury dusts, particularly where the seed coats were damaged.
4. Chemical weed control in fibre flax and linseed. By J. C. Friederich, pp. 109-11. In trials comparing DNBP, MCPA and DNOC, DNBP gave the best results in terms of weed control and yield of fibre and linseed. The maximum treatments of DNBP are 5 l. per ha. on sandy soils, and 6 l. per ha. for fibre flax and 7.5 l. per ha. for linseed on clay soils. High-volume MCPA sprays containing 0.5 kg. of active material in 1000 l. water per ha. can be applied to fibre flax not above 5 cm. high and to linseed between 5 and 10 cm. high. Low-volume MCPA sprays on fibre flax have caused severe injury.
5. Varietal trials with linseed and studies of the factors that influence seed yield and oil content. By J. C. Friederich, pp. 111-15. In 12 trials in different regions with 8 varieties, the highest yielding were Valuta and B 5128, followed by Rabat 0-1, 2162-A, Victory, Minerva and Rocket.
6. Storage trials with seed sugar-beet and seed fodder-beet roots. By P. Gaastra, pp. 116-18.
7. Potato storage research. By W. H. de Jong, pp. 118-27. The studies reported deal mainly with bulk storage in insulated houses.
8. Report of results obtained in trials with DNOC during 1951. By H. J. Eggink, pp. 127-31. Rye was sprayed with DNOC at the 3-leaf stage and again at the 4-leaf stage, with and without applications of N after the DNOC treatment. The results indicated that DNOC had a specific manurial value apart from the N applications, and that the grain yield of controls given N treatment, but no DNOC, was lower than where N + DNOC was given, the higher the N treatment (up to 48 kg. per ha.) the greater the yield increase from DNOC, mainly the result of increased ear size and 1000-grain weight.
9. The occurrence and control of *Alopecurus myosuroides* in Groningen. By P. Riepma, pp. 131-4. Foxtail can be controlled by growing root crops ; spring cultivations kill seedlings germinating in spring and intensive autumn ploughing will control autumn-germinated seedlings.
10. Factors governing flower and tuber formation in Jerusalem artichoke. By H. L. van de Sande Bakhuyzen and H. G. Wittenrood, pp. 135-48.
11. Cold resistance of 300 west European wheat varieties, compared with their rate of growth in spring. By G. H. Wittenrood, pp. 148-9. The trend was for very winter-hardy varieties to develop slowly in spring and for non-winter-hardy varieties to develop rapidly in spring. A fairly large group of varieties combined good, or very good, winterhardiness with rapid growth in spring.—P.J.B.

830 **Netherlands.** Rapport van de Commissie ter Bevordering der Suikerbietenteelt in de Noordelijke Provinciën over 1951. [Report for the year 1951 of the Society for the Promotion of the Cultivation of Sugar-beet in the Northern Provinces.] *Meded. Inst. rat. Suikerprod.* 1952, **22,** No. 3, 163-249.

INVESTIGATIONS REPORTED :
1. Plant population, pp. 171-5. Plants were thinned to 45, 55, 65 and 75 thousand per ha. The highest yields of roots, tops and sugar were obtained where the stand numbered 75,000 plants per ha.
2. The effect on sugar content of a long interval between the topping and lifting of beet, pp. 181-5. Topped sugar-beet was allowed to remain in the ground for 1, 2, 3 and 4 weeks before being lifted. The average losses in sugar content were 0.9% after 1 week, 1.5% after two weeks, 1.9% after three weeks and 2.2% after 4 weeks.
3. Virus yellows, pp. 186-98. The incidence of

virus yellows was higher in the districts of mixed cultivation than in purely arable regions. There was no correlation between the percentage of cultivated land occupied by beet and beet for seed in any area and the incidence of the disease in that area. The high incidence of virus yellows in individual fields, however, was associated with the proximity of beet grown for seed. The influence of poor soil structure and poor stands of beet on the development of the disease is discussed.
4. Manganese deficiency, p. 199. This was noted on heavy land in a dry period at the end of June. The deficiency was corrected by applications of 0.5-1.5% manganese sulphate solution at the rate of 1000 l. per ha.
5. Beet fly (*Pegomyia hyoscyami*), pp. 199-200. The beet fly did less damage than in the previous year. Where chemical insecticides were used, Parathion was more effective than DDT or BHC.
6. Seed-drills, pp. 202-4. The results of trials of various Dutch types of seed-drills are tabulated. In some drills there was a considerable variation in the weight of seed sown per ha. by each seed-tube.
7. Precision seed-drills, pp. 205-6. In many cases where polished beet-seed was sown with a precision drill the emergence of seedlings was irregular. A reduction of 30% in the cost of singling was obtained by the use of precision drills.
8. Beet-lifting machinery, pp. 212-19. An account is given of a demonstration of beet-toppers, lifters, lifter-cleaners and complete harvesters on soil in a wet condition. The performance of the “ Catchpole” harvester is described. The loss of leaves and root-tips in this type of harvester is considered to be too high.
9. Trials of methods of cultivation and sowing, pp. 220-46. Where precision drills and polished seed were used the emergence of seedlings was irregular. Seedlings from unpolished seed emerged earlier than those from polished seed and consequently it was possible to begin weeding earlier where unpolished seed was used. In most cases rolling after drilling favoured the emergence of seedlings more than harrowing after drilling.—W.J.B.

831 **Netherlands.** 16de Jaarboekje van het Comité voor Brouwgerst, 1952. [16th yearbook of the National Committee for Malting Barley, 1952.] Rotterdam, 1952, pp. 104, illus., English summary pp. 7.

INVESTIGATIONS REPORTED :
1. The difference between Balder and Kenia spring barley as determined by the grain. By I. Kooi and F. E. Nijdam, pp. 31-42. The lack of red pigment in its tissues, and particularly in its glumes, differentiates Balder from all other varieties grown in the Netherlands. The lack of brown veining of the glumes of Balder is a reliable index of its admixture with Kenia in the field. This feature is not so reliable for differentiating Saxonia from Balder. The grains of Saxonia, unlike those of Balder have small hairs along the furrow.
2. A possible method for controlling brown rust (*Puccinia simplex*) in spring barley. By W. Wilten and C. Kramer, pp. 43-9. In trials to determine the effect of brown rust on barley yields, 0.25% Dithane Z78 (Zn ethylene bis-dithiocarbonate) spraying resulted in almost complete rust control and significantly higher grain yields and grain quality than untreated controls.
3. Field trials with spring barley in 1951. By W. Wilten, pp. 64-8. Varietal trials, with Balder as standard, are reported. In determinations of straw stiffness, Rika, Herta, Breusted 1038/45 and Agio were classified as stiff-strawed ; Balder, Heine 505, Wisa, Carlsberg, Kenia, Haisa II and III, Pirol and Heine 506 as medium stiff-strawed ; Saxonia, Earl and Goudgerst, as weak-strawed. The German varieties were least susceptible to mildew.
4. Yields, statistics and characters of spring barley varieties. By W. Wilten, pp. 69-79. Notes are given on varietal trials in different regions of the Netherlands, the distribution of different varieties in different regions and the agronomic characters of the 6 leading spring barley varieties in the Netherlands, namely : Abed Kenia, Agio, Balder, Goudgerst, Mansholt's 2-rowed and Saxonia.—P.J.B.

832 EMPIRE COTTON GROWING CORPORATION. Progress reports from Experiment Stations. Season 1950-51. London, 1952, pp. 159. [See also *Fld Crop Abstr.* 5 : 321.]

INVESTIGATIONS REPORTED :
Cotton Research Station, Namulonge, Uganda.
1. Effect of elephant grass (*Pennisetum purpureum*) and other straw mulches on the yield and growth of flat and ridged cotton, p. 9. Mulch applied to the cotton about a month after an August sowing, on new land, led to a measurable depression in growth and a yellowing of the foliage. Flowering rate was little affected and yield differences were unimportant.
2. Experiments on the efficiency of various inoculation techniques to determine the resistance of a range of cotton strains to bacterial blight (*Xanthomonas malvacearum*) and Verticillium wilt disease (*V. dahliae*), pp. 12-20.
Uganda.
3. Investigations on the control of blackarm disease (*X. malvacearum*), using the seed dressings Agrosan GN5, Agrosan GN6, Perenox, and R1038, with, or without, the insecticides DDT or BHC, pp. 27-35.
4. Investigations into the characters of the varieties BP52, S47, B181, K.P.28 and S4108, pp. 35-44.
Tanganyika, Lake Province.
5. The effect of a three years' “ tumbledown ”

allow on the succeeding indicator cotton crop, p. 48-9. The yield of cotton was significantly reater after the tumbledown fallow than after a imilar fallow which had been planted with local rasses and legumes.

. Comparison of the effects of organic and in-rganic fertilizers on cotton growing on hill-sand, p. 49-52. Phosphate applied at sowing, com-ined with nitrogen top-dressed at flowering, gave igher yields of cotton in the year of application han did compost alone, though compost gave igher residual responses than phosphate in suc-eeding years.

enya, Nyanza Province.

. Cotton varietal trials, pp. 64-7. The variety JK48 gave an increased lint yield of 20% over the arieties N17, BP52, and S47. It has been decided o replace the variety N17 by UK48 in South yanza and BP52 by S47 in other areas.

yasaland.

. The effect of N dressings on lint yields, pp. 4-5. Response of cotton was proportional to the dressings.

outhern Rhodesia, Gatooma.

. Fertilizer placement trials on cotton, com-aring (a) nitrate of soda, superphosphate and otash fertilizers and (b) sulphate of ammonia, uperphosphate and sulphate of potash, pp. 99-101. n (a) and (b) there was a significant response o superphosphate and potash. In (a), nitrate itrogen gave a small, non-significant response and n (b) ammonium nitrogen gave a significant lecrease in seed-cotton yield.

10. Comparison of the efficiency of a mechanical icker with ordinary hand-picking, p. 101. The inning and cleaning processes of mechanically-icked cotton, variety 9L34, gave 18.5 % greater oss than Class 1 hand-picked seed-cotton.

11. Comparison of the suitability of the varieties L34 and 42204 for mechanical picking, pp. 101-2. t was apparent that 42204 material contained uitable mechanical picker-type strains.

12. Comparisons of the defoliants ammonium hiocyanate and FR/9, p. 102. FR/9 was superior o ammonium thiocyanate.

13. Experiments to examine the effect of applying ertain insecticides on the development of Sudan-, American- and spiny-bollworm, cotton stainers and aphis, pp. 102-4. [See Abs. 708.]

Northern Nigeria.

14. Observations on the shedding of cotton flower-uds and bolls, pp. 111-12. Counts showed that igher rate of shedding was a consequence of a igher level of fruiting, and not a precursor of oorer yield.

15. Effect of acid treatment on cotton seed, p. 112-13. Final yields indicated no advantage in cid treatment under good conditions, but acid reatment may prove helpful in less favourable onditions.

16 Trials in progress to determine the main effects and interactions of organic manures and fertilizers applied annually to the local crop rotation p. 114. In one experiment where cotton was the test crop, significant increases in yield were given only by pen manure and sulphate of ammonia.

17. Date of sowing trials on cotton in relation to red bollworm activity (*Diparopsis* sp.), pp. 124-30. Sowing in late June or early July produced highest yields.

West Indies, Antigua.

18. Trials on the residual effects of pen manure and NPK on cotton yields, pp. 134-5. Results followed the same trends as in 1950.

19. The effect of the following cropping systems on the succeeding cotton crops, pp. 135-7 : (1) sugar-cane plus 2 ratoon crops ; (2) elephant grass cut for forage over the same period ; (3) continuous cotton ; (4) continuous cotton broken by a year of leguminous cover crop. Treatments (1), (2) and (4) gave better growth and higher flowering than continuous cotton (3), but only in treatment (4) was the final yield increased.

20. Cotton varietal trials at Montserrat and Nevis, pp. 138-41. The varieties VH10 and VH8 slightly out-yielded MSI and BD.

21. Cultivation trial on the effect on cotton of (a) poor and thorough cultivation, (b) early and late land preparation, (c) the effect of N fertilizers, p. 146. There was no obvious effect from manuring or type of cultivation. Early cultivation produced improved plant growth and 21% increased yields. There was a significant interaction between time and type of cultivation ; the bad effect of late preparation being enhanced by poor cultivation.

22. The effect of delayed digging-under of Guatemala-, Guinea- and elephant-grass residues on cotton yields, p. 146. The bad effect of planting cotton immediately after the ploughing under of grass residues was shown by reduced cotton yields.

Queensland, Biloela.

23. Irrigation × rotation × cotton-strain trial, pp. 154-5. Non-irrigated plots significantly out-yielded at the 1 % level both the irrigated plots following grass and those following cotton. The later-maturing MBC cotton strains yielded significantly less cotton than did the early-maturing Miller 41S and 43-9 strains.—K.L.

833 **Florida** Agricultural Experiment Station. Annual Report for the fiscal year ending June 30, 1951. Gainesville, [n.d.], pp. 277.

INVESTIGATIONS REPORTED :

1. Groundnut improvement. By W. A. Carver and others, p. 47. A sister line to Dixie Runner, formerly known as Fla. 230-118, was released in 1951. This variety is now named Early Runner and is about 2 weeks earlier in maturing than Dixie Runner and 3 weeks earlier than common runner groundnuts.

2. Prevention of skinning of potato tubers. By C. B. Hall, p. 89. Trials are in progress to test methods of reducing skinning at harvest. Delaying harvest until 105 days after planting, combined with removing the haulms 1 or 2 weeks before harvest, resulted in highly significant decreases in the amount of skinning compared with tubers which were harvested 90 days after planting, with no haulm removal. Delaying the time of grading into sizes after harvest by 24 hr. resulted in a significant reduction in skinning, compared with tubers which were graded immediately after harvest.—P.J.B.

834 **United States.** Southern Weed Conference Fifth Proceedings, 1952. pp. 213.

The 5th Annual Conference was held at Atlanta, Georgia, in February, 1952. Among the papers read were the following :

1. Some herbicidal properties of CMU. By L. E. Cowart, pp. 10-11. [See *Fld Crop Abstr*. 5 : 1307.]

2. Phthalamic acid derivatives for pre-emergence weed control. By A. W. Feldman and A. E. Smith, pp. 12-14. [See Abs. 772.]

3. The effect on soyabeans and Sudan grass of chemicals and their persistence in the soil when applied as pre-sowing, pre-emergence and post-emergence sprays. By W. C. Shaw and others, pp. 15-22. [See Abs. 596.]

4. Structure and function in nutgrass (*Cyperus rotundus*). By T. J. Musik and H. J. Cruzado, p. 24. Notes are given on the growth-regulating activity of different parts of nutgrass tuber systems. It is suggested that control of nutgrass could be achieved by inverting, or breaking up, nutgrass tuber systems and bringing them to light to induce sprouting. The sprouts can then be killed by 2,4-D.

5. Development and testing of specialized equipment for weed control in cotton. By L. E. Creasy and others, pp. 27-36. Notes are given on rolling and firming attachments to sowing equipment for preparing the seed-bed for pre-emergence sprays and also on preliminary investigations into the use of rake-type electrodes for electrocuting plants. The experiments are considered to indicate the possibilities of the method for cross-blocking cotton in the field and for weed control.

6. Pre-emergence screening of chemicals for weed control in cotton. By J. T. Holstun, pp. 47-53. In wet conditions, several formulations of DNOSBP, ClIPC, CMU and PCP gave good weed control, with little injury to cotton. In both wet and very dry conditions, only the DNOSBP formulations and ClIPC gave consistently good results.

7. Isopropyl N-3-chlorophenyl carbamate (ClIPC) as a pre-emergence herbicide for weed control in cotton. By O. A. Leonard and others, pp. 54-8. In 2-years' greenhouse and field trials, pre-emergence spraying with 5 lb. ClIPC per ac. was equal, or superior, to dinitro or IPC treatment for controlling crabgrass (*Digitaria* spp.). Weed control at harvest following pre-emergence applications of ClIPC was still excellent and the cotton appeared to have a high tolerance to this herbicide.

8. Pre-emergence weed control in cotton and soyabeans with chloro IPC and pentachlorophenol. By C. M. Gates, pp. 59-63. ClIPC pre-emergence sprays were very effective in controlling annual grasses in cotton and soyabeans when used at rates greater than 1 lb. per ac. in band applications over the rows, but deep-rooted perennial weeds were not controlled. 3 to 4 lb. of ClIPC were needed to control pigweed (*Amaranthus* sp.). Extended drought following ClIPC application reduced its effectiveness. Pentachlorophenol gave effective weed control when 6 gal. of an 8% solution were applied per ac. in bands over the rows. In no cases were the crops affected by the treatments.

9. Pre- and post-emergence studies for chemical weed control in cotton. By W. C. Normand and others, pp. 65-9. The results are given of trials with a number of herbicides, including dinitro formulations in oil and water, TCA, CMU, ClIPC and 3 aromatic oils. CMU at 1 to 3 lb. per ac. and the dinitro formulations at 2 to 6 lb. per ac. were most effective as post-emergence treatments.

10. Post-emergence screening of chemicals and methods for weed control in cotton. By J. T. Holstun, pp. 79-87. [See Abs. 704.]

11 Cotton reactions to the application of certain aromatic oils as post-emergence herbicidal sprays. By R. Y. Ratcliff and others, pp. 88-90.

12. Weed and grass control in cotton. By G. L. White, pp. 91-3. Notes are given on the results of 5-years' studies of petroleum solvent herbicides for weed control in cotton.

13. Progress report on weed control in cotton. By E. S. Hagood, pp. 101-4. Notes are given on weed control trials in Georgia with oil- and water-soluble DNOSBP, CMU and ClIPC as pre-emergence sprays, followed by post-emergence treatment with aromatic oils.

14. Chemical weed control experiments in soyabeans and maize. By N. S. Peck and D. A. Hinkle, pp. 119-26. DNOSBP applied at rates of 1.5 and 3 lb. per ac. severely injured soyabeans in trials in Arkansas. Lion Herbicidal Oil No. 1 as a post-emergence treatment and Lion Oil Sample 19-204 as a pre-emergence treatment were the only materials to give good weed control without crop injury. With maize, Dow Premerge (dinitro formulation) at a rate of 1.5 lb. per ac. gave excellent control of broad-leaved and grass weeds, with no apparent injury to the crop.

15. Pre-emergence weed control studies with soyabeans. By W. E. Chappell, pp. 127-8. [See Abs. 597.]

16. Wild garlic in Arlington oats controlled by

mpetition plus the use of 2,4-D. By G. C. Kling-
an, pp. 132-4. [See Abs. 513.]
. A progress report on weed control in mechan-
ed production of sweet potatoes. By W. D. Poole
d T. P. Hernandez, pp. 162-5. [See Abs. 692.]
. Field drying of rice by chemicals. By D. A.
inkle, pp. 175-7. Notes are given on trials with a
mber of proprietary defoliants.—P.J.B.

5 **British Guiana.** Annual report of the Director of Agriculture for the year 1950. Georgetown, British Guiana, 1952, pp. 43. [Received 1953]

epth of water in rice-fields, p. 21. A trial was made
determine the effects of various depths of water
the yield of rice crops. The best yields were
tained when the water was held at a depth of 10
ches. Rice variety trials, p. 28. Three new varieties,
54/42, D95/52 and D85/42 outyielded the stan-
rd variety No. 79, by 20, 14 and 14 %, respec-
vely. D85/42 is notable for its exceptionally stiff
raw and for the high milling quality of its grain.
-W.J.B.

6 **Gold Coast.** Annual Report of the Department of Agriculture for the year 1950-51. Accra, 1952, pp. 29, 2s. 6d.

VESTIGATIONS REPORTED :
Cotton, p. 9. Yields in the Northern Territories
ere poor due to excessive boll-shedding. No
rther work on this crop will be carried out until
ecialist staff is available.
Potatoes, p. 9. In Ashanti the 13th generation
Up-to-Date potatoes proved equal in yielding
pacity to freshly imported seed.
Rice, p. 9. In the Western Province, Guiana 79
ve a yield of 3000 lb. paddy per acre compared
th 800 lb. from the local variety Bagulam. In
e Northern Territories, bunded valleys with a
m at their head proved very successful for rice-
owing and at Navrongo the average yield from
25 ac. treated in this way was 2800 lb. of paddy
r acre.
Soyabeans, p. 9. The varieties Plot 40 and
adian yielded 1360 lb. per acre.
Corn stalk borers, p. 9. Control of *Sesamia* spp.
maize was more effective with DDT than BHC.
o details given.]—C.L.S.

7 **Basutoland.** Annual Report of the Department of Agriculture for the year 1950. Maseru, [n.d.], pp. 25. [Received 1952] [See also *Fld Crop Abstr.* 4 : 605.]

ials of rust-resistance in mountain wheat var-
ies, pp. 9-10. The early varieties Hope and
hatcher gave the highest yields and were almost
e from rust. The local mountain varieties Ceres
d Talberg were badly attacked by rust.—K.L.

8 **Tanganyika** Department of Agriculture. Annual Report for 1950. Dar es Salaam, 1952, pp. 262.

[See also *Fld Crop Abstr.* 4 : 920.]

INVESTIGATIONS REPORTED :

1. The effect of various smut dressings (Nomersan, sulphur, and TMTD) on the yield of sorghum at Dodoma, Singida and Kondoa, p. 61. In 2 out of the 3 experiments, sulphur dressings [amounts not specified] gave the least number of smutted heads and the highest yields of grain per ac. In the third experiment, although the sulphur treatment gave the lowest number of smutted heads, the Nomersan treatment gave the highest yields per ac.
2. Trials on introduced dwarf varieties of sorghum at Wami, p. 62. These varieties were not attacked by birds when grown in proximity to tall sorghums.
3. Cassava variety trials at Tumbi and Ukiriguru, pp. 87 and 234-5. Comparison of mosaic-resistant cassavas from the Amani Institute with the standard local variety Liongo showed that the former remained free of mosaic, but were so badly attacked by rats and wild pigs that yields were negligible. Liongo, although infected with mosaic, still gave a reasonably good yield, probably because of its unpalatability to vermin.
4. Comparison of the effect of *Pennisetum* of various sizes of ridge (3 ft., 4 ft., and 5 ft.) with flat cultivation at Mwanhala, p. 87. There were no significant differences between treatments.
5. Fertilizer trials on wheat at Dabaga (Ifuenga) and Sao Hill (Iheka), pp. 117-18. Sulphate of ammonia, lime and muriate of potash had no effect on wheat yields. Farmyard manure gave increased yields. Phosphate was similar in its effect to farmyard manure in one experiment.
6. Wheat variety trials at Uyole and Njiapanda, p. 118. Although over 20 varieties were tested no variety was outstanding.
7. Linseed varietal trials at Uyole, Njiapanda, Mbosi and Njombe, pp. 118-19. Punjab was the most successful variety for general cultivation.
8. Control of insect pests of grain in storage at Morogoro, p. 177. Excellent control of the rice weevil, *Calandra oryzae*, in millets mixed with sorghums and stored in silos was obtained by admixing 0.5 ppm. Gammexane with the top and bottom layers of grain only.
9. Investigations at Korogwe on rearing fish in the same water in which rice was growing, pp. 187-8. The trial area produced a total of 1918 lb. of rice per ac. and 92 lb. of fish per ac. This was considered satisfactory as this land had never before produced more than 10 lb. of beef per ac. per annum.
10. Selection trials at Ukiriguru, on the production of a striga- and stalkborer-resistant, early-maturing sorghum, with a palatable grain which stores and yields well, pp. 222-7.
11. Variety and spacing trials with sorghum, pp. 227-9. Although no conclusions can be drawn yet from the experiments, it was evident that dwarf

varieties gave better yields from close spacings.
12. Trials at Ukiriguru, on the pre-soaking of sorghum seed in water, ammonium sulphate, single and triple superphosphate solutions, and dusting the seed with single and triple superphosphate powders, p. 231. All treatments depressed the yield of sorghum below that of the control.
13. Manurial trials on rice at Mwabagole, pp. 236-9. Results over the last few years indicate that the puddling in of green material from *Cassia* and tree cassava gave a larger increase in straw weight than pen manure. Grain yields showed similar responses in years when growing conditions were good.
14. Cultivation trials on rice at Mwabagole, comparing early weeding (11 days after transplanting) and late weeding (30 days after transplanting), p. 239. Early weeding gave the best results.
15. Variety × spacing × clump planting trial with rice at Mwabagole, pp. 240-1. Results showed that : (a) clump planting had no effect ; (b) spacings of 6 in. × 6 in. were superior to all other spacings but there was little difference between 6 in. × 12 in. and 12 in. × 12 in. spacings ; (c) the yield of the rice variety Gamti was higher relative to the freely tillering variety Kahogo than expected. Gamti was 31 days later than the variety Pishori.—K.L.

839 **Madras.** Administration reports of subordinate officers of the Department of Agriculture, Madras, for 1950-51. Madras, 1952, pp. 804

Investigations reported :
1. Rice, pp. 31-9. A programme of hybridization is being carried out for breeding varieties of rice resistant to blast (*Piricularia oryzae*), premature sprouting, drought, saline conditions and the effects of deep-water cultivation. The blast-resistant varieties Co.25 and Co.26 are notable for good tillering, response to manuring and resistance to lodging.
2. Cotton, pp. 47-57. Among irrigated summer Cambodian cottons, the improved strain 7682 consistently outyielded Madras Uganda-1. Gl × Co. 2-9-3 proved the best yielder among irrigated American cotton for black soils.
3. Millets and maize, pp. 58-105. Improvement is reported in grain sorghum. The control of *Striga* (sp. not given) by the development of resistant varieties of sorghum and by agronomic methods, is being investigated. Two imported varieties of maize, A.H. IFI and U.S.13 F1, outyielded local varieties.
4. Oilseeds, pp. 106-33. The improved T. M. V. strains of sesame have yielded well.
5. Pulses, pp. 134-42. Results are given of trials of strains of the following pulses : *Cajanus cajan*, *Phaseolus aureus*, *Ph. mungo*, Chickpea (*Cicer arietinum*), *Dolichos biflorus*, *D. lablab*, and *Vigna unguiculata*.
6. Entomology, pp. 192-201. The chemical control of the following pests of rice is described : *Schoenobius incertellus*, *Ripersia oryzae*. *Pachydiplosis oryzae*, *Nephotettix bipunctatus* and *Thrips oryzae*.
7. Sweet potatoes, p. 284. In variety trials at Coimbatore the variety B.196 gave the highest yield, 22,337 lb. per acre.
8. Crop protection, pp. 591-690. The chemical control of insect pests and fungus diseases of rice, millet, groundnut, sesame, cotton, wheat, jute and potatoes is described. On groundnut, hairy caterpillars (*Amsacta albistriga*) up to 15 days old, were easily controlled by BHC dust. Algal growth on rice fields was controlled by applications of Fernoxone mixed with ashes.—W.J.B.

840 **Ceylon.** Administration Report of the Director of Agriculture for 1950. Colombo, 1951, pp. 168. [Received 1953]

Investigations reported :
1. The manuring of rice nurseries, p. 20. In manurial trials at Batalgoda on seedling beds (where rice was grown up to the transplanting stage) it was found that applications of sulphate of ammonia at the rate of 30 lb. N per ac. increased the size of the plants in the nursery but significantly reduced their yield of grain. Applications of superphosphate at the rate of 30 lb. P_2O_5 per ac. gave a significant increase in grain yield of 4%.
2. The effect on rice yields of varying the date of transplanting, p. 20. Rice seedlings (of varieties which mature at the age of 5-6 months) were transplanted at various ages. Generally, rice transplanted when 4-5 weeks old gave the highest yields. In similar trials on varieties of the 3.5-4 months age group, the optimum age for transplanting most varieties was found to be 24 days. In this group the variety C20 [of Burmese origin] outyielded all varieties, including Vellai Illankalayan 28061. Some varieties of the 3-3.5 month age group yielded less when transplanted than when sown broadcast. It appears that only certain varieties in this group, e.g. Dahanala, benefit from transplanting.
3. Methods of rice cultivation, p. 136. Rice is normally sown broadcast in Ceylon and not transplanted. In the Western District the area of transplanted rice increased from 180 ac. in the north-east monsoon period of 1948-9 to 6500 ac. in the corresponding period of 1950-1. Sample harvests in the same season in 1949-50 indicated that transplanted rice yielded on the average 20 bu./ac. more grain than rice which had not been transplanted.—W.J.B.

841 **South Pacific Commission.** Tech. Pap. 29. Current research in the South Pacific in the field of economic development. 1952, pp. 82, 2s.

INVESTIGATIONS REPORTED :

. Kenaf, p. 16. Kenaf (*Hibiscus cannabinus*) has een successfully grown in trials in New Guinea nd Papua. Results suggest that kenaf should be rown in preference to jute.

2. Rice variety trials in Fiji, p. 22-3. The British Guiana varieties, B.G. 75, Ramcajara and B.G. 79 gave the highest yields in the main season 1950-51. B.G. 75 gave a yield of 1.38 tons per ac. Three varieties, Motka, New Guinea and China Patna, already established in Fiji, outyielded the British Guiana varieties in late season trials.

3. Fertilizer trials with cassava, p. 55. Cassava (*Manihot utilissima*) was subjected to the following three manurial treatments, each treatment providing the same amount of N per acre : (a) sulphate of ammonia at 1.5 cwt. per ac., (b) candlenut meal at 4.5 cwt. per ac., (c) coconut meal at 10.5 cwt. per ac. The increases in yield over control resulting from treatments (a), (b) and (c) were 50%, 34% and 26%, respectively.—W.J.B.

NEWS ITEMS AND NOTES

Great Britain

42 TROWSE MUSTARD is a form of *Brassica juncea* which is resistant to shattering and gives a better average yield in the south-eastern part of England than brown mustard (*B. nigra*) or white mustard (*Sinapis alba*). The average height of the plant is between 4 ft. and 5 ft. and even on the most fertile soils it does not exceed 6 ft. as compared with 0 ft. in brown mustard. The plant is of a compact branching habit, is not subject to lodging and is easier to cut with binder or swather than are the other mustards. Because f its good seed retention, and because its quality does not uffer from adverse weather, it is suitable for combining from the swathe. The seed is bold, round, and dark rown in colour.—[In litt.]

Netherlands

43 CROP YIELDS 1851-1951. Figures are presented howing the average yields in q. per ha. of the main Dutch field crops over the period 1851-1951. The average yield of potatoes, which increased more than that of any ther crop, was 82 q. per ha. (3.5 tons per acre) in the period 851-60 and 258 q. per ha. (10 tons per acre) in the period 948-51. The average yield of wheat increased from 14 q. per ha. (11 cwt. per acre) in the period 1851-60 to 36 q. er ha. (28.5 cwt. per acre) in the period 1948-51. *Maandbl. Landb VoorlDienst* November, 1952.—W.J.B.

Germany

44 CONFERENCE OF SUGAR-BEET TECHNICIANS. The Conference was held in Holtensen-Göttingen in July, 1952. t was attended by representatives of research institutes, ugar factories and the chemical manure industry, also by plant protection officials and members of cultivators' ssociations. A paper on manuring by Dipl.-Ldw von Bodungen dealt with general principles, these to be applied ccording to circumstances rather than by exact prescription. Dr. Nitzsche read a paper on the fodder value of he sugar-beet, whether used as the raw product or as silage. Papers by Dipl.-Ldw. Schürnbrand, Professor Rademacher nd Dr. Steudel were concerned, respectively, with the ontrol of the cockchafer larvae, the disease caused by *ercospora*, and the "Vergilbungs" virus disease of beet. *Zucker* August, 1952.—D.B.

845 CONFERENCE ON CROP HUSBANDRY. A report on a Conference on Crop Husbandry held at Bad Schwalbach, Western Germany, in October, 1950, consists of abstracts of papers presented, which include the following:

Sachs (Weihenstephan). Summer-sown winter vetch. Six years' experiments in sowing, for seed, winter vetch as an annual in the summer instead of in the autumn gave good results. *Vicia faba* was used as a supporting plant, the seeding rate being 120 kg. *V. faba* to 6, 12, and 24 kg. winter vetch per hectare. Seed setting was especially good in *V. pannonica*, good in the glabrous form of *V. villosa*, but poor in the hairy form of *V. villosa* except in 1949. A large-scale experiment using 125 kg. field beans + 45 kg. oats + 15 kg. winter vetch also gave a good yield of vetch seed (3 to 6 dz. per ha.). Grain development is better in summer-sown than in autumn-sown vetch, and there is no difficulty in sowing, harvesting, threshing and cleaning. A preliminary trial of *Lupinus angustifolius* as a support for vetch grown for seed is encouraging. For breeding material, vetch should not be summer-sown.

The use of ethylene chlorhydrin, ethylene dichloride and carbon tetrachloride in a ratio of 7 : 3 : 1 effected rapid germination in all the potato varieties studied. In studying the physiological processes set up it was found that the ratio of starch to sugar is in the closest connexion with the new formation of other substances. Comparison of the induced with natural germination is being continued. The method enables several generations to be grown in one year.

O. Fischnich (Braunschweig-Völkenrode). Flower-shedding and fruit-setting in the potato. Flower-shedding has been prevented and fruit-setting encouraged by treatment with growth substances. Success depends upon the stage of development of the inflorescences. Treatment at different times of the day and in different kinds of weather did not materially affect results. It remains to be tested whether the fruit formed contain seeds capable of germination.

A. Scheibe (Neuhof Research Station, Giessen). Increasing beet-seed production. By a radical cutting-back at an early stage of development, or by repeated cutting-back of the primary seed-bearer during the growth period (once, twice, or even thrice), it is possible to induce in the *Beta* spp. a considerable amount of basal or axial shoot formation and thereby to bring about an increased seed production of 25 to 30% and more under suitable climatic conditions.

Gliemeroth (Göttingen). Structure and water conduction in loam soils. The subject was discussed in connexion with the differing root systems of different crop plants.

v. Boguslawski (Giessen). Catch-cropping with reference to newly-bred strains of plants. A short account is given of catch-cropping experiments conducted in different parts of Germany with millets, sorghums, rapes, and *Lathyrus sativus*. *Z. Acker- u. Pflbau* Feb., 1951, 93, No. 2, 258-66. [Received 1952]—G.M.R.

UNESCO

846 THE ADVISORY COMMITTEE ON ARID ZONE RESEARCH, set up by UNESCO, met in London in Sept./Oct., 1952. It was decided that a survey of current research in the field of arid zone plant ecology be prepared. The symposium planned to be held in 1953 (in a Latin-American country) will be concerned with this aspect of plant ecology. The Committee recommended that assistance be given to the following projects : (1) A project proposed by the Institut Français d'Afrique Noire to study the effects on plant cover of natural factors, mainly climatic, and of human intervention, such as stock grazing, trampling and wood cutting. Data on this subject are much needed, especially since they bear on the deterioration of natural pastures. (2) A project proposed by Dr. F. W. Went, of the Earhart Plant Research Laboratory, California Institute of Technology, to study the role of dew in plant growth in arid regions. (3) A project proposed by Prof. L. Picard, Geological Institute, Jerusalem, Israel, to investigate the climatic changes that have taken place during the Quaternary in the arid and semi-arid region of the south-east Mediterranean. *Nature, Lond.* 27 Dec., 1952. —M.H.

FIELD CROPS

CEREALS

WHEAT

847 SINGH, K. **Effects of soil cultivation on the growth and yield of winter wheat. 1. Soil cultivation and winter survivals.** *J. Sci. Fd Agric.* 1952, **3,** No. 6, 256-64, bibl. 25. [Edinburgh]

The object of the investigation was to determine the extent by which reduced preparatory cultivation would effect the yield of autumn-sown wheat and thereby reduce costs. Three treatments, ploughing to 8 in., cultivating to a depth of 3-4 in. or more, and shallow cultivation of 1.5-2 in., were replicated 6 times on 6 different farms, for 3 seasons, between 1945 and 1948. The effect varied with the type of soil and with the season ; in ploughed and 4-in.-cultivated soils, winter survival was superior to that in shallow cultivated soils in mild seasons, but the reverse was the case during a severe winter. Early sowing of the crop with shallow 2-in. cultivation is suggested for reducing frost injury in open-textured and light soils during moderate as well as severe winters.—M.A.

848 SINGH, K. **Effects of soil cultivation on the growth and yield of winter wheat. 2. 'Stand' and tillering.** *J. Sci. Fd Agric.* 1952, **3,** No. 8, 354-61, bibl. 9, illus. [Edinburgh]

Investigations into the effects of cultivation on the stand and tillering of winter wheat were carried out during 1945-8 at 6 farms in Scotland using 4 varieties of winter wheat. The cultivation treatments consisted of ploughing to a depth of 8 in., and cultivating to 2 in. and 4 in., respectively, using a tine cultivator. In the open-textured, light, sandy soils, under shallow cultivation, shoot numbers were higher, tillering was better, the soils were more compact and showed higher moisture contents and higher temperatures than in the ploughed or deep-cultivated soils. The dominant factor in spacing effect was the density of the initial stand and where this was thin not even maximum tillering was able to effect a compensation in the final stand.—M.A.

849 SINGH, K. **Effects of soil cultivation on the growth and yield of winter wheat. 3. Crop growth.** *J. Sci. Fd Agric.* 1952, **3,** No. 9, 426-32, bibl. 18. [Edinburgh]

Investigations of the influences of ploughing and cultivating to a depth of 2 in. and 4 in. on the growth and yield of winter wheat were carried out on six farms in Scotland during 1945-9. In rich soils, the method of cultivation had little effect on the yield ; in the poorer soils, yields were reduced if the cultivator was used instead of the plough. Depth of cultivation had no effect on the date of maturity of the wheat crop or on the straw/grain ratio.—From author's summary.

850 SINGH, K. **Effects of soil cultivation on the growth and yield of winter wheat. 4. Effects of cultivation on root development.** *J. Sci. Fd Agric.* 1952, **3,** No. 11, 514-25, bibl. 27, illus. [Edinburgh]

A study of the effects of cultivation on root development of winter wheat was made in two Midlothian soils, Boghall and Corstorphine, during the years 1945-6 and 1946-7. Cultivation treatments consisted of ploughing to a depth of 8 in., deep cultivation (4 in.) and shallow cultivation (2 in.) with a tined cultivator. Ploughing to a depth of 8 in. induced a higher degree of branching at 10-20 cm. and 20-30 cm. depths than did working the soil to 4 or 2 in. with a tine cultivator. At the early stages of plant growth, top/root ratio in crop weight as well as in surface area was smaller with the 2-in. tine cultivation than with ploughing or 4-in. cultivation. No such differences existed between the treatments after manuring. A deficiency in the supply of nitrogen in the 2-in. tine-cultivated plots was indicated.—From author's summary.

851 SINGH, K. **Effects of soil cultivation on the growth and yield of winter wheat. 5. Effects of cultivation on the nitrogen uptake and growth of crop in unfertilized and fertilized soils.** *J. Sci. Fd Agric.* 1952, **3,** No. 12, 570-9, bibl. 16. [Edinburgh]

Cultivation experiments were conducted during the 1945-7 seasons on four soils in the Midlothians, Scotland. These soils differed markedly in fertility and other physical and chemical conditions. Treatments consisted of ploughing to a depth of 8 in. versus shallow and deep cultivation with a tined cultivator to depths of 2 in. and 4 in., respectively. The wheat crop removed greater amounts of nitrogen and produced greater growth and greater yields in the unmanured plots of two of the soils when ploughed, as opposed to tine-cultivated. When the plots were manured the differences between the cultivation treatments disappeared in the richer soils but persisted between ploughing and one or both types of tine cultivation in poor soils, according to the fertility status of the soil. The response of the crop to nitrogenous manures was twice as great in tine cultivated plots as in ploughed plots. The level of fertility of a soil seemed to be the determining factor in its response to different types of cultivation. In a well-drained and fertile soil, tine cultivation to a depth of over 2 in. could replace ploughing if an application of nitrogen was made.—M.A.

852 GESLIN, H. and VERNET, A. Maturation du blé et du climat. [**Effect of climate on wheat maturation.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. B. Ann. Amélior. Pl.* 1952, **2,** 253-6, bibl. 1. [Tunis]

Relationships between the fresh weight, dry weight and water content of wheat plants and the period of growth are shown by graphs from data obtained at Versailles and Tunis. The maximum dry and fresh weights were reached several days before actual physiological maturity.—M.A.

853 SCHENDEL, U. von. Die Wirkung künstlicher Beregnung in Sortenversuchen bei Winterweizen, Wintergerste, Erbsen und Kartoffeln. [**The effect of artificial rain on winter wheat, winter barley, beans and potatoes.**] *Z. PflErnähr. Düng.* 1952, **59,** 27-48, bibl. 8, illus. [Berlin]

The effect of artificial rain on wheat, barley, beans and potatoes was tested during the years 1948-51. Additional artificial rain to the extent of 20-40 mm. on winter wheat and barley was profitable only during marked dry periods at the peak of growth. Artificial rain applied to beans at the beginning of their vegetative growth was profitable. Applications of artificial rain to potatoes at flowering time gave increased yields.—M.A.

854 BASTIANONI, M. L'influenza della temperatura sull'accestimento dei grani marzuoli. [**The influence of temperature on tillering in March wheats.**] *Riv. Ecol.* 1952, **2,** No. 2, 212-18, English summary p. 218. [Ist. Ecol. Agr., Univ. Perugia, Italy]

Eight wheat varieties, Timilia from Sicily, Marzatico from central Italy, Wagenburg from Switzerland, Janetzki and Gelchsheimer from Germany, Halland and Dala from Sweden, and Börsum from Norway, were each grown at 18 different localities between 33° and 63° N. latitude. Results from these trials indicated that the average number of tillers per plant was greater as the temperature increased. Although temperature was the most important meteorological factor affecting tillering, as shown by the high correlation coefficient of +0.626 between temperature and tillering, rainfall also appeared to have a positive influence on tillering.—E.B.O.

855 AZZI, G. Analisi differenziale dei rendimenti: determinazione dell'effetto del suolo, della topografia, della concimazione e della lavorazione del terreno sul rendimento in granella del frumento. [**The differential analysis of yield: determination of the effect of soil, topography, manuring and tillage on the grain yield of wheat.**] *Ann. Sper. agr.* 1953, **7,** No. 1, 137-45, illus., English summary p. 145. [Ist. Ecol. Agr., Univ. Perugia, Italy]

An account is given of trials in which the effect of the above 4 factors on the yield of Virgilio wheat was studied on the basis of the method of differential analysis of yield, by which the effect of each factor is examined as a function of the other 3 in all possible combinations. Two extreme aspects of each factor were considered, i.e. soil type: good and poor; topography: level and sloping ground; tillage depth: 30 cm. and 15 cm.; manuring: 200 kg./ha. of biammonium phosphate and no fertilizer. Results showed that the average increase in yield obtained from good soil was 1687 kg./ha. and that this was from 3-4 times greater than any of the average increases ascribed to the beneficial effect of level ground, deep tillage or fertilizer.—E.B.O.

856 KARUZIN, B. V. [**Sowing winter wheat on stubble in the middle Volga region.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk (Proc. Lenin Acad. agric. Sci.)* 1952, **17,** No. 8, 16-17. [Timašev State Var. Sect.]

The sowings of winter wheat in the middle Volga area are greatly restricted because of the partial destruction of the crops during winter after being sown on fallow. Records of sowings made in the Kuĭbyšev Province show that yields of winter wheat are improved when the sowings are made on stubble.—M.H.

857† DAVTJAN, G. S. [**A new method of growing winter wheat on unploughed lucerne.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk (Proc. Lenin Acad. agric. Sci.)* 1953, **18,** No. 2, 3-7. [Agrochem. Lab., Acad. Sci. Armenian SSR]

In the zone for irrigated cotton in the Ararat lowland, Armenia, lucerne is the primary fodder crop for improving the heavy, argillaceous, structureless soil, which is poor in humus and nitrogen. In the past, before the introduction of a system of crop rotation, lucerne was grown consecutively for more than 3 or 4 years, and sometimes for 15-20 years. The crop gave 3 to 5 cuts per annum and 120-200 centners per hectare [1 centner = 100 kg.] of high-quality lucerne hay were obtained. At the present time (in Armenia, Azerbaĭdzan and the Republics of Soviet Central Asia) in the cotton/wheat rotation, the growing of lucerne is limited to 1 or 2 years and the need for extending the life of the lucerne stand has been stressed. While details of the system for his extension have yet to be worked out, the nethod advocated is, in general, as follows : a ucerne stand of 1-, 2- or 3-years' growth is irrigated n such a manner that at the time of the final cut, he soil becomes somewhat dry. Lucerne is cut for he last time a few days before the date of sowing vinter wheat (in Ararat, any time from 20 Sept. to 0-15 October). The lucerne stubble is fertilized vith N (60-90 kg./ha.), P_2O_5 (30-40 kg./ha.) and K_2O (25-30 kg./ha.). The area is then worked chiselled) to a depth of 5-10 cm. Following this, a lisc drill is used for sowing the normal quantity i.e. for the locality) of winter wheat together with 0 kg./ha. granulated superphosphate. In this ereal/legume break of the cotton rotation, the rocedure as outlined enables a normal yield of vheat to be obtained, together with a harvest of ıcerne hay and, it is anticipated, a crop of lucerne eed. After the wheat is harvested, a further 2 or cuts of lucerne can be obtained. The effect on soil tructure of the wheat/lucerne crop is said to be imilar to that produced by a grass/legume break ı the cotton rotation.—M.H.

58 BAYLES, B. B. and TAYLOR, J. W. **Wheat production in the eastern United States.** *Fmrs' Bull. 2006. U.S. Dep. Agric.* 1951, pp. 50, illus. [Received 1953]

he area in question includes all States east of the lississippi river and eastern Texas and Oklahoma, outh-eastern Kansas, Missouri, Arkansas and linois. Among recommended varieties are larkan, Fairfield, Vigo, Fultz, Trumbull, Fulhio, orward, Nured, Leap, Leapland, Vahart, Purple- raw, Flint, Redhart, Carala, Hardired, Sanford, hancellor, Atlas 50, and 66 and Seabreeze beard- ss soft-red wheats with white or yellow chaff; horne, Seneca, Red May, Currell, Poole and loking beardless soft-red wheats with brown or red haff ; Fulcaster, Nittany, VP.I. 131, Newcaster, udy, Nigger, Royal, Saline, Butler, Blackhawk, udel and Kawvale bearded soft-red wheats with hite or yellow chaff ; Mediterranean, Goens, rairie, Austin and Supremo bearded soft-red heats with brown or red chaff ; Yorkwin, Cornell 95 and Dawson soft-white wheats and Pawnee, urkof and Brill hard-red wheats. Each variety is escribed. Recommendations are made for the ıltivation of wheat in this area and notes given ı insect pests and diseases.—P.J.B.

59 FAJERSSON, F. Weibulls Original Bancovete (W. 10752). Ny, mycket högt avkastande höstvetesort för södra Sverige. [**Weibulls Original Banco wheat (W. 10752). A new, very high-yielding winter wheat variety for south Sweden.**] *Weibulls ill. Årsb.* 1953, **48,** 3-6, illus.

'eibulls Banco was produced for conditions of tensive cultivation and combines high grain yields and good baking quality with winterhardiness. In official trials begun in 1946 in 6 districts in Sweden, the grain yield of Banco was 3940 kg. per ha. in 73 trials, compared with 3600 kg. for Hansa. In 63 trials, the yields of Banco and Skandia III B were 3900 and 3640 kg. per ha., while in 80 trials, the yields of Banco and Eroica were 3950 and 3770 kg. per ha., respectively. In 13 trials at Weibullsholm during 1945-51, Banco outyielded Eroica by an average of 2.8%. Banco has done best in trials in Östergotland, where in 15 official trials, it has outyielded Eroica by an average of 7.7%. In the hard winter of 1946-7, Eroica over-wintered better than Banco, which still proved superior to Standard II and Skandia III in this respect. Banco has slightly stiffer and shorter straw than Eroica and has matured about 3 days earlier than Eroica at Weibullsholm ; it has also given 6-7 % higher bread volume than Eroica. Banco is recommended for growing in the Skåne, Östergotland, Halland, Kalmar and Gotland districts on fertile soils.—P.J.B.

860 FAJERSSON, F. Weibulls Original Ertusvete (W. 11746). Ny, högt avkastande och mycket vinterhärdig höstvetesort för mellersta Sverige. [**Weibulls Original Ertus wheat (W. 11746). A new, high-yielding, very winter-hardy winter wheat variety for middle Sweden.**] *Weibulls ill. Årsb.* 1953, **48,** 7-10, illus.

Ertus was produced for conditions in middle Sweden from a cross between Eroica and Virtus and is a variety combining the high yield and stiff straw of Eroica with the winterhardiness of Virtus. In official trials since 1948, Ertus has outyielded Ergo, Ergo II, Aros, Odin and Robur by 5.1, 4.7, 4.4, 2.6 and 4.4%, respectively, and has given very much the same yield as Virtus. In trials in the Uppsala district during 1948-51, Ertus has outyielded Ergo, Aros, Odin and Virtus in over 25 trials by 9.1, 6.5, 3.7 and 2.6%, respectively. Ertus, therefore, appears to be well adapted to the Uppsala region. Ertus seems to be similar to Ergo in straw stiffness, but slightly inferior to Eroica and Odin. The grain quality of Ertus has been superior to all other varieties grown in middle Sweden, and, in trials over several years, has given about 6% greater bread volume than Eroica.—P.J.B.

861 ZWEIFEL, J. and KELLER, C. Le froment de printemps Lichti. [**The spring wheat variety Lichti.**] *Rev. rom. Agric.* 1952, **8,** No. 12, 93-5. [Sta. Féd. Essais Agric., Lausanne]

According to trials at Lausanne and Zürich, Lichti, a spring wheat bred in Germany and known there as Lichti's Early Weihenstephan, gives a grain yield greater than that of any other variety tested. It gave a quantity of straw equal to or only slightly less than that of Huron, taken as the standard variety, and proved superior to Huron in its utilization of nitrogen, its earliness and its resistance to heavy rainfall and brown rust. It is inferior to Huron in its resistance to black rust and *Erysiphe graminis*, and equals Huron in milling and baking qualities.—G.M.R.

862 Thorpe, H. C. **Cereals for 1953-54** [**in Kenya**]. *K.I.O. Fortnightly* 1953, No. 245, 1-4.

A new physiologic form of black stem-rust designated K.12 appeared on wheat during the past season. With one exception (R. 64 being resistant to all 12 rust forms) all varieties now grown are susceptible to one or more of the forms. A description of older resistant varieties and new releases is given, also a table showing the seedling reactions of the more commonly grown varieties to the 12 rust forms. Information is also given on baking quality, straw strength, time to maturity and upper safe limit in Kenya to which each variety can be grown to escape yellow ear-rust. Prior barley, a two-row malting variety, is recommended for the 5000 to 9000 ft. range in Kenya. It matures at approximately 3.75 months at 6000 ft., 4.3 months at 7100 ft. and 5 months at 9000 ft.—M.A.

863 Watson, I. A. and Singh, D. **The future of rust resistant wheat in Australia.** *J. Aust. Inst. agric. Sci.* 1952, **18,** No. 4, 190-7, bibl. 11. [Univ. Sydney]

864 Pal, B. P. **Some contributions to superior germplasm in wheat.** *Indian J. Genet. Pl. Breed.* 1952, **12,** No. 1, 5-9, illus. [Indian Agric. Res. Inst.]

Notes are given on 15 of the more important New Pusa varieties of wheat bred by the Indian Agricultural Research Institute. An account is given of the characteristics of each variety, including rust-resistance and adaptability to local conditions in various parts of India.—W.J.B.

865 Virri, T. J. Satakunnan kasvinviljelyskoeaseman koetuloksia v. 1945-52. **Results of experiments at the Satakunta Experimental Station (Period 1945-52).** *Valt. Maatalousk. Tiedon.* 1953, No. 231, 3-45, English summary pp. 43-5. [Peipohja, Finland]

The results of tests to determine the suitability for local conditions in Finland of varieties of the following crops are reported : spring wheat, barley, oat, peas and potatoes.—M.H.

866 Laričeva, M. D. [**Productivity of hybrids in relation to growth conditions of the parent forms.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, **20,** No. 1, 10-21. [Timirjazev Agric. Acad.]

Wheat varieties constitute the material of this work.—M.H.

867 Kiričenko, F. G. and others. [**The choice of wheat varieties for irrigation farming in the southern Ukraine.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, No. 3, 11-23, illus. [Lysenko All-Union Inst. Genet.]

Information is supplied on the characteristics of wheat crops (developmental phases, grain quality, resistance to *Puccinia triticina* and *P. glumarum*, and yields) when grown with and without irrigation. The varieties studied include the regionalized types : Odesskaja 3, 12 and 16 ; Lutescens 1163 ; Melanopus 37 ; Narodnaja ; and the so-called prospective types : No. 289/48 ; No. 375/48 ; Piemenka ; Melanopus 213/51 ; Hordeiforme 183/50 ; and Lutescens 57/46. The data show that, under irrigation in the southern Ukraine, hard spring wheats are preferable to soft spring wheats and that, of the varieties tested, Lutescens 1163, is outstanding in lodging resistance and for high yields.—M.H.

868 Zdriljko, A. F. and Delone, L. N. [**Experiments on varieties of winter wheat for irrigation farming.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, **20,** No. 1, 69-75. [Genet. Inst., Ukraine SSR]

The above Institute conducted tests during 1951-2 on 13 varieties of winter wheat for irrigated areas in the southern Ukraine. The trials were carried out on the Brilevsk Experiment Station for Irrigation (Herson Province) to determine the most suitable types for the irrigated region of the southern Ukraine in regard to resistance to lodging, drought and frost. There is an indication that yields of more than 50 centners per hectare may be obtained in the area concerned as a result of wheat selection.—M.H.

869 Da Costa Neto, J. P. Bibliografia das moléstias do trigo no Rio Grande do Sul. [**Bibliography of the diseases of wheat in the Rio Grande do Sul.**] *Rev. Agron., Porto Alegre* 1952, **16,** Nos. 184-6, 58-74, bibl. 65.

870 Batts, C. C. V. and Elliott, C. S. **Indications of effect of yellow rust on yield of wheat.** *Pl. Path.* 1952, **1,** No. 4, 130-1, bibl. 1. [NIAB, Cambridge]

Trials were carried out at 13 centres in England during 1945-7, to compare the yield of the wheat variety Wilma, susceptible to yellow rust (*Puccinia glumarum*), with that of the resistant variety Juliana. Wilma yielded significantly less than Juliana in each of 4 trials in which it was attacked by yellow rust before mid-June. In these trials, the average yield of Wilma was 78% that of Juliana.

hen rust attack was later than mid-June, the duction in yield was small. The variety Pilot is so reported to be susceptible to yellow rust.—B.O.

71 GUYOT, L. and MASSENOT, M. Observations et expérimentations sur la Rouille Noire des céréales au cours des années 1948 à 1950. **[Observations on *Puccinia graminis* of cereals from 1948 to 1950.]** *Ann. Inst. nat. Rech. agron., Paris. Sér. B. Ann. Amélior. Pl.* 1952, **3,** 507-23. [Crignon]

he behaviour of a large number of wheat varieties strains of *P. graminis tritici* is given ; strains elonging to race 15 of *P. graminis tritici* showed a igh degree of virulence. Only the varieties GN, P, *Triticum timopheevi* and, to a lesser extent, hatcher, showed signs of resistance.—M.A.

72 AZZI, G. Le basi ecologiche della evoluzione del grano. **[The ecological basis of the evolution of wheat.]** *Riv. Ecol.* 1952, **2,** No. 2, 139-55, English summary p. 155. [Ist. Ecol. Agr., Univ. Perugia, Italy]

nformation is given on the migrations of wheat om its origin centres, which have determined its resent distribution in the world, an excess or a eficiency of temperature and of precipitation being e limiting factors. Under extreme conditions, otanically different types of wheat converge wards a same ecotype, whilst in intermediate nes where conditions tend to the optimum, ifferent types, well adapted to the environment, re found. The soft wheats are more adaptable nd have a wider area of distribution than the urum wheats. Varieties particularly resistant to rought, lodging, cold or heat, are mentioned.—.B.O.

73 RUFFALDI, G. B. Nuove indagini sulla biologia del frumento. **[New investigations on the biology of wheat.]** *Humus* 1953, **9,** No. 1, 14-16.

here is a point in the life of the wheat plant, ifficult to recognize in practice, indicating the assage from the vegetative to the reproductive hase. In the early-maturing types, both these hases are short ; in the late-early types, the first hase is long and the second short ; and in the late ypes both phases are long. The requirements and dvantages of each of these types of wheat are riefly described and several Italian wheat varieties re named for each type. The first N application ould be made to wheat when the plants are in the to 4-leaf-stage. The second at the time of passage om the vegetative to the reproductive phase (the proximate times of this passage in the plains, ills and mountains of Italy are given). The third plication should follow 10 days after the second. -E.B.O.

874 VERVELDE, C. J. **The agricultural value of awns in cereals.** *Neth. J. agric. Sci.* 1953, **1,** No. 1, 2-10, bibl. 28. [Lab. Crop Husb., Wageningen]

The literature on the subject of the influence of awns on the yield of cereals is reviewed. The majority of workers agree that awns influence the yield of cereal varieties favourably. Experiments were carried out in 1946-7 to determine the influence of awns on the growth and yield of wheat plants. A number of crosses were made between 2 awnless and some bearded varieties of winter wheat and the F_2 generations of 12 different crosses were examined. The growth of each plant in the 12 populations was studied individually so that it was possible to state later, when the difference between awnless, bearded and intermediately bearded plants became noticeable, whether differences in habit during the early stages of development were related to the character of awnedness. The bearded plants had on the average more tillers, culms and grains per plant and were in general more robust than awnless plants. For bearded, awnless and intermediately bearded plants, respectively, the 1000-grain weight was 42.6 g., 40.49 g. and 40.81 g. and the weight of grain yielded per plant 8.93 g., 7.96 g. and 8.95 g. The intermediately bearded groups of plants yielded more grains per plant than the awned group and in most respects appeared to be more robust than either the bearded or the awnless groups. The unexpected vigour apparently displayed by the intermediately bearded group was attributed to mistakes made in classifying the intermediately bearded and awnless groups, which can easily be confused. It is suggested that the most reliable picture of the favourable influence of awns on yields can be obtained by comparing the average yield per plant of the bearded group with that of the other two groups combined. From the results of experiments made in 1923, 1943 and 1946, to determine the effect of de-awning the spikelets of growing plants of wheat and barley on the 1000-grain weight of the grain harvested, it was concluded that awns account for about 4% of the yielding capacity of bearded wheat and about 10% of the yielding capacity of spring barley. To complete the de-awning tests of 1943 and 1946 chemical analyses were made of samples of seeds derived from the tests. The protein content of grain from de-awned spikelets of wheat was higher than that of grain from untreated bearded spikelets, indicating that the contribution of the awn to the grain consists of matter (probably mainly starch) low in protein content. The ash content of the grains from bearded and de-awned samples varied little and the variations could not be related to the absence or presence of awns. The ability of awns to increase the yield of grain is ascribed to their assimilatory activity. The successful adaptation of bearded wheats to warm, dry climates can be ascribed to the xeromorphous nature of the awns and to the fact that the awn is in a young and active stage at the time of most rapid seed development and is therefore more likely to function well under harsh conditions than the other assimilatory organs which are in a more mature and less productive stage than the awns at the time of seed formation.—W.J.B.

875 REBISCHUNG, J. and KARSKA, K. Etudé de la valeur systématique de quelques caractères observables sur le grain et les plantules de blé tendre. [**Study of the systematic value of some characters observable in the grain and seedlings of soft wheat.**] *Ann. Inst. nat. Rech. agron., Paris.Sér B. Ann. Amélior. Pl.* 1952, **2,** No. 1, 1-30, bibl. 5, illus. [Sta. Cent. Génét., Versailles]

Keys are presented which enable rapid identification of the soft-wheat varieties commonly grown in France according to characters readily discernible in the grain and seedlings. The grain characters used are : ratio of maximum width to length ; ratio of the length of the scutellum to total length ; ratio of the length of the brush to total length ; position of the extremity of the radicle in relation to the contours of the grain ; shape of the extremity of the radicle ; ratio of the length of the epicotyl to that of the radicle. Seedling characters used are : intensity of colouring in the coleoptile ; pilosity of the tip of the first leaf on its emergence from the coleoptile ; pilosity of the ligules of the first three leaves ; habit of the first two leaves at the beginning of tillering ; ratio of the length of the ligules of the first two leaves at the beginning of tillering.—G.M.R.

876 JONARD, P. and others. Évolution de la tige et de l'épi chez la variété de blé Vilmorin 27 au cours de la période de reproduction. [**Development of the haulm and spike in the wheat variety Vilmorin 27 during the reproduction period.**] *Ann. Inst. nat. Rech. agron., Paris. Sér B. Ann. Amélior. Pl.* 1952, **2,** No. 1, 31-54, bibl. 9, illus. [Sta. Cent. Génét., Versailles]

An account is given of a 4-year study of Vilmorin 27, a winter wheat. Different characteristic stages in the development of the spike are described, namely, formation of the spike, appearance of glumes, differentiation of the stamens, meiosis, and other intermediate stages. Observations made of the relative lengths of haulm and spike have shown that the spike presents, for a given stage of the autumn-winter-sown plant, a clearly defined length and, in addition, that important variations in the growth of the haulm are produced at the time when certain stages are attained. Different stages in the development of the spike are therefore proposed as characteristic criteria of development in the life of the plant. Similar studies of Vilmorin 27 sown in spring and summer showed that, whenever the date of sowing, the plant was capable of attaining the beginning of the reproductive phase ; but the fluctuation observed both in the attainment of the different stages as well as in the lengths of spike and haulm, at each sampling, became considerable in sowings made at the end of April or afterwards.—G.M.R.

877 SCHRIMPF, K. Beobachtungen über den Entwicklungsrhythmus der Weizenformen; dargestellt am Hohenheimer Weizensortiment. [**Observations on the rhythm of development in wheat forms as represented in the Hohenheim collection of wheats.**] *Z. Acker- u. Pflbau* 1952, **94,** No. 4, 480-529, bibl. 12. [Inst. Pflbau Pflzücht., Hohenheim, Stuttgart]

In an attempt to classify wheat varieties by means of their physiological characters, studies were made from 1946 to 1949 inclusive. The Hohenheim winter wheat collection embraced over 800 varieties and the summer wheat collection over 400. Information is given on the weather during the period of study. Observations were made of the time and environmental factors when the plants (1) came up (two-thirds of the stand displaying the first green leaf) ; (2) began to ear (when the first ear in the plot left the leaf sheath) ; (3) began to flower (appearance in the plot of the first anthers, a character too much influenced by environmental conditions to be of use for varietal identification) ; and (4) matured (when the straw was yellow and the uppermost nodes of the haulms began to brown). It was found that the sum of warmth required for the phases of development, and not the duration of these phases (which is liable to greater fluctuation), is characteristic of the different forms and varieties. Tabulated data show : that for the winter wheats the sum of warmth required for the whole duration of vegetation is a varietal character ; that in the summer wheats the sum of warmth required for the phase earing-to-maturity is subject to less fluctuation than the total sum of warmth required and is therefore characteristic of the different varieties ; that the summer wheats vary more considerably under different environmental conditions than do the winter wheats.—G.M.R.

878 DIEHL, R. Quelques aspects de la résistance au froid chez les céréales d'hiver. [**Certain aspects of resistance to cold in winter cereals.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. B. Ann. Amélior. Pl.* 1952, **2,** 257-303, bibl. 37, illus. [Sta. Amélior. Pl., Rennes]

Field and refrigerated-chamber experiments on 8 wheat varieties, Alsace 22, Moutot à Epi Rouge, Vilmorin 23, Vilmorin 27, Siegerlander, Minhardi, Préparateur Etienne and Pusa 4, were conducted to

ermine their physiological resistance to cold.
principal characters studied were : dry-
ter content, reducing-sugar content, fixed-
er content, osmotic pressure, protein content
The resistant varieties had a higher osmotic
ssure than those less resistant. Minhardi at the
of the resistance scale was characterized by a
cellular content which fluctuated with tem-
ature variations ; Pusa 4, which was the most
eptible to cold, reacted little to variations in
perature. Methods of calculating the osmotic
ssure by means of the freezing-point method
outlined. In conjunction with the physiological
estigation, a morphological examination of the
nts was undertaken. It was found that the older
leaf tissues, the more susceptible was the plant
old ; the marginal, stomatal cells, which had a
her cellular concentration than their neighbours,
n remained alive surrounded by dead tissue.
y young tissues and active, growing points were
susceptible to cold. In general, the more
stant varieties had greater numbers of stomata
small cells, while the less resistant varieties
fewer stomata and larger cells. Observations
le on the secondary root-system showed that
stant varieties tillered later than susceptible
eties and this was considered due to the per-
nce in the former of the primary roots. At the
ring stage the problem of resistance to cold
complicated by other factors, such as tillering
city.—M.A.

ALLEN, H. P. **The relative toxicity of 2 : 4-dichlorophenoxy acetic acid and 2-methyl-4-chlorophenoxyacetic acid to wheat, oats and barley.** *J. Sci. Fd Agric.* 1952, **3,** No. 8, 378-84, bibl. 12.

n evidence obtained both in Great Britain and
ad it appears that the wheat crop is fairly
tant to both MCPA and 2,4-D provided that
ge rate of chemical and stage of crop are
ct for the circumstances prevailing. Oats are
most susceptible to a lowering of yield and
quality ; experimental results suggest that,
spring oats at least, 2,4-D is more toxic than
A. Barley seems more liable to abnormalities
either oats or wheat and more abnormalities
aused by 2,4-D than by MCPA.—From author's
nary.

Coïc, Y. La nutrition azotée du blé. [**The nitrogen nutrition of wheat.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. A. Ann. agron.* 1952, **3,** No. 3, 417-21, bibl. 7. [Lab. Physiol. Vég., Versailles]

paper deals with the N requirements of wheat
aximum grain yield and for good milling and
g quality ; also agricultural technique in re-
to the N nutrition of this crop. [See also *Fld*
Abstr. 4 : 324, 963 and 964.]—G.M.R.

881 BISSETT, W. J. and ANDREW, C. S. **The effect of nitrogen on the yield, nitrogen content, and baking quality of wheat grown on the Darling Downs, Queensland.** *J. Aust, Inst. agric. Sci.* 1953, **19,** No. 1, 40-4, bibl. 4. illus.

882 KUTHY, S. and others. Nitrogén fejtrágyázás hatása a gabona terméshozamára. [**Effect of supplementary nitrogen on the yields of wheat.**] *Agrokém. és Talaj.* 1952, **1,** No. 4, 437-46, bibl. 35, Russian, German and English summaries pp. 444-6.

The experiments described show that, under the arid conditions which prevail in Hungary, a late application [date not mentioned in summaries] of N (in the form $NH_4NO_3 + CaCO_3$) increases grain and protein yields of wheat and barley. The extent of the improvement depends on the moisture content of the soil. In the absence of adequate precipitation, the nitrogen should be applied in a spray.—From authors' summary.

883 KIZIMA, P. N. [**The effect of irrigation and fertilizers on the quality of spring-wheat harvests.**] [Russian] *Sovet. Agron.* (*Soviet Agron.*) 1952, **10,** No. 12, 27-33.

This work was carried out in the Novouzensk irrigation area, Saratov Province, in 1940 and 1948-50. Tabulated data record the features of the grains (including yields) of several varieties of hard and soft wheats grown with and without irrigation and on fertilized and unfertilized plots.—M.H.

BUCKWHEAT

884 TSVETOUKHINE, V. Le sarrasin et ses possibilités d'amélioration. [**Buckwheat and the prospects for improving it.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. B. Ann. Amélior. Pl.* 1952, **2,** No. 1, 99-115, bibl. 14, illus. [Sta. Amélior. Pl., Rennes]

Shortly before the 1939-45 war, France occupied second place among buckwheat-producing countries with 355,000 ha. under this crop, but by 1950 the area had fallen to 101,859 ha. The history of the crop in France is outlined and a botanical study is presented of the 4 principal spp. of *Fagopyrum*, namely, *F. esculentum*, *F. emarginatum* (which the author considers to be a ssp. of *F. esculentum*), *F. tataricum* and *F. stenocarpa* (considered to be a ssp. of *F. tataricum*), special attention being given to the morphology and histology of the seeds, in which the principal differences between *F. esculentum* and its ssp., and also between *F. tataricum* and its ssp., are found. An account is then given of the author's study of fertilization and seed setting in *F. esculentum* and of experiments in mass selection and interspecific hybridization. The principal types of buckwheat (the names of which have a geographical rather than a genetic significance) are described.—G.M.R.

885† STANJUKOVIČ, K. V. [**Prospects of utilizing a viviparous buckwheat as a crop in high mountain regions and in the tundra.**] [Russian] *Bot. Z. SSSR* (*Bot. J. USSR*) 1952, **37,** No. 3, 377. [Pamir Biol. Sta., Bot. Inst. Acad. Sci., Tadžik SSR]

In order to utilize wide areas in the tundra and the high mountain regions of USSR for agriculture, it is necessary to select a crop which, in contrast to the wild plants in these regions, combines hardiness with a comparatively high nutritive value. In the tundra the wild bilberries, *Vaccinium* spp., etc. are more succulent than nutritious and are therefore unsuitable as feed. It is claimed that viviparous buckwheat [*Fagopyrum* sp.] is more promising in this respect. At the base of the inflorescences of this buckwheat there are bulbils which serve as reproductive organs. These bulbils are edible and contain (in % of dry weight) 30.2 sugar (including 26.4% saccharose, 2.37% monose), 8.1 starch and 6.35 hemicellulose. The analyses for oil and protein have not yet been completed. It has been estimated that, in a natural pasture, approximately 1 centner of bulbils per hectare may be obtained. The rhizomes also contain a good proportion of nutrients and it is calculated that 500-1000 kg. per ha. of rhizomes may be harvested. In 1951 selection work at the above Station was started on this crop in order to produce a type for cultivation in the mixed pastures of the tundra and mountain regions. Samples of seed may be obtained from The Pamir Biological Station, P.O. Box 19, Oš, Kirgiz SSR.—M.H.

OATS

886 STANTON, T. R. **Production, harvesting, processing, utilization and economic importance of oats.** *Econ. Bot.* 1953, **7,** No. 1, 43-64, illus. [Pl. Industr. Bur., U.S. Dep. Agric.]

This is a brief review, written mainly from the standpoint of the crop in the USA. The chief varieties grown there are dealt with in some detail. —P.J.B.

887 RAPPE, G. **Seasonal variations in some properties of arable soil. 1. Variations in oat plant-producing capacity.** *Pl. and Soil* 1953, **4,** No. 3, 197-222, bibl. 21, illus.

Studies were made in Sweden during 1943-5, in which the seasonal variations in the productivity of 5 different soils were compared by taking samples from the fields at regular intervals during the season, placing them in pots in a photothermostat and growing oats on the soil samples for 35 days. Determinations were then made of the dry weight of the above-ground parts and the roots of the oats to determine the productivity of the soils. Samples of each soil were taken from plots sown with oats, undersown with clover/grass mixtures, and also from plots on the same soil types which were kept bare of all vegetation. Other soil samples from each soil type were kept in cellars to provide an environment for oat growth as free from climatic variations as possible. On all soils, clear evidence of a seasonal fluctuation in the level of soil productivity was apparent. This rhythm was more apparent on the one sphagnum and two low-moor soil types used, than on the two mineral soils. As determined by oat-top growth, the lowest levels of soil productivity were in mid-summer and mid-winter, the highest levels occurring in late spring and early autumn. On cropped soils, the level of soil productivity in middle and late summer and autumn was lower than on uncropped soils. The summer drop in soil productivity as evidenced by the plant-top yields, was less marked in the case of root yields and occurred later in the roots than in the tops. The amplitude of the seasonal fluctuation in the productivity of the soils kept in the cellars was similar to that of the soils in the field.—P.J.B.

888 KELLY, A. F. **Variety trials of winter oats 1944-50.** *J. nat. Inst. agric. Bot.* 1952, 6, No. 2, 133-9.

Details are given of varietal trials with autumn-sown oats carried out at 11 centres in England during 1944-50. From the average results for all trials, each of the three varieties S.147, S.172 and 10/3 substantially outyielded the control variety Grey Winter. Picton also outyielded the control but its average yield was not as high as that of the other three. S.147 gave consistently good grain yields and showed good resistance to lodging, but was not resistant to eelworm. S.172 gave variable yields depending on the soil fertility. It showed the greatest resistance to lodging. The variety 10/3 did not yield so well as S.147 but was better than Picton. It was not resistant to eelworm nor did it resist lodging as well as the other trial varieties. Picton gave rather lower yields than S.147 but was eelworm-resistant. Its grain had a consistently low husk content which almost approached that o Grey Winter. Results are also given for Marvellous (autumn sown) and Star (spring sown), each at one centre for three seasons.—C.L.S.

889 KELLY, A. F. **Variety trials of oats for upland areas 1949-51.** *J. nat. Inst. agric. Bot.* 1952, **6,** No. 2, 140-8.

Two groups of oats were considered in these trials laid down in England and Wales. The first group contained varieties which are particularly early in ripening and, because of their shorter maturation od, offer a more certain harvest in late areas. second group comprised varieties selected to nstand hard conditions and which are said to be to withstand a poor growth environment on r soil. Two series of trials on a field scale were ducted for 3 years from 1949-51 but the high nber of trials which could not be harvested sfactorily was a reflection of the high altitude heavy rainfall, which limited the conclusions t could be drawn. In the first group the ieties Primus, Orion III and Clinton are worth sideration. In the second, Radnor Sprig and ck Tartar had no special virtues whilst Victory Maldwyn appeared equally at home on medium poor soils at high altitudes as on similar areas of lowlands. Where straw for feeding is required 20 may be of value.—C.L.S.

FREY K. J. **Oat varieties for southern Michigan.** *Quart. Bull. Mich. agric. Exp. Sta.* 1953, **35,** No. 3, 294-8.

e results are given of yield trials with oats in th Michigan. Varieties recommended for grow- there are : Clinton, Craig, Eaton and Kent, h of which is briefly described.—P.J.B.

ELLIOTT B. B. and LEOPOLD A. C. **An inhibitor of germination and of amylase activity in oat seeds.** *Physiol. Plant.* 1953, **6,** No. 1, 65-77, bibl. 17. [Ind. Agric. Exp. Sta., Lafayette]

e studies reported demonstrated the existence a water-soluble germination inhibitor in the seed ls of Victory oats. The inhibitor is thought to be olypeptide of relatively high molecular weight l was shown to exercise a quantitatively in- iting action on alpha- and beta- amylase and on growth of etiolated pea sections. The signifi- nce of these findings is discussed, with particular erence to the possibility that this inhibitor may by its inhibition of certain enzyme systems ncerned with the germination process.—P.J.B.

2 RADEMACHER, B. and OZOLIŇŠ, J. Einfluss der Getreidekonkurrenz und des Nährstoffgehalts im Keimsubstrat auf Keimung und Jugendentwicklung verschiedener Unkräuter. [**Competitive effect of cereals and the effect of the nutrient level in the seed bed on the germination and early development of different weeds.**] *Angew. Bot.* 1952, **26,** No. 2, 69-93, bibl. 27. [Stuttgart-Hohenheim]

1947-8 and 1951, experiments were conducted test the effect of oats and wheat on the germina- n and growth of young weeds, in particular *utricaria inodora*. Weed seedling counts were less the autumn under winter oats than under winter eat and, up to the spring, the weed population s noticeably less under winter oats than under nter wheat. It was concluded that the higher germination percentage and quicker establishment of weed seeds and seedlings were due solely to the N content of the soil. Root excretions obtained from water and sand cultures did not indicate any root excretions toxic to *Matricaria.*—M.A.

893 MARSHALL, E. R. and van GELUWE, J. **Three years' results with the use of MCP and 2,4-D for weed control in seeded [undersown] grains.** *Proc. 7th N.E. Weed Contr. Conf. 1953* 1953 181-6, bibl. 2. [G.L.F. Soil Bldg Serv., Ithaca, N.Y.]

Seven different herbicidal treatments were made to oats 12-14 in. high, undersown with lucerne, ladino clover (*Trifolium repens*) and red clover (*T. pratense*), 2-3 in. high. The crop was infested with wild mustard (*Brassica* sp.). The treatments included 100 and 60% MCPA triethanolamine salt, Na MCPA, 100 and 60% low-volatility butoxyethanol ester formulations of MCPA and 2,4-D amine salt. In all 3 years, excellent control of wild mustard was obtained following the use of both the 2,4-D amine and the MCPA formulations at rates of 0.5 lb. per ac. The 60% MCPA amine formulation was less injurious to the undersown lucerne and clovers than were the other MCPA formulations and 2,4-D, and gave good control of wild mustard and other weeds, such as lambsquarters (*Chenopodium alba*) and ragweed (*Ambrosia artemisiifolia*). From these results it was concluded that where weeds such as wild mustard were a problem, the use of 60% MCPA amine formulations at rates of 0.125 to 0.3 lb. acid equivalent per ac. in low-volume sprays (5-8 gal.) were satisfactory for weed control in cereals undersown with legumes. —P.J.B.

894 BERG, Å. Angrepp av nematoder på havre. [**Nematode attack on oats.**] *Vaxtskyddsnotiser., Stockh.* 1952, **6,** No. 5, 69-74, illus.

Notes are given on the spread of oat nematode (*Heterodera major*) and stalk nematode (*Ditylenchus dipsaci*) in oat crops in Sweden. No chemical means of control have yet been found. In the case of oat nematode, spring wheat and spring barley are also attacked by this parasite. Among barley varieties, Svanhals and Brage have shown considerable resistance and work is in progress on the control of oat nematode by the production of resistant varieties. In the case of both parasites, crop rotation remains, at present, the best control measure known.—P.J.B.

895 NICHOLAS, D. J. D. and FISHER, D. J. **The manganese status of cereal crops in relation to yield of grain and straw. 1. Field experiment on oats. 1949 and 1950.** *Rep. agric. hort. Exp. Sta. Long Ashton 1951* [n.d.], 77-87, bibl. 26, illus. [Received 1952] [Bristol Univ.]

Studies on manganese deficiency in oats were carried out on a plot of a sandy black loam derived from Pennant Grit. The plot had been intensively cultivated for a number of years, had a pH of 7.1 and contained 1.1, 3.1 and 341 ppm. of exchangeable, easily reducible and total Mn, respectively. Most crops on the plot had shown severe symptoms of Mn deficiency. Crops of S 84 oats were subjected to various treatments with a view to correcting Mn deficiency. The placement of S at 2, 4 and 8 cwt. per ac. with the oat seed had no effect in preventing the incidence of grey-speck disease (Mn deficiency disease). Applications of $MnSO_4$ at the rate of 96 lb. per ac. with the seed gave higher yields than no treatment or applications of S with the seed but failed to give good control of grey-speck disease. The most effective treatments were foliar sprays of 0.1, 0.25 and 0.5% $MnSO_4$ applied at the rate of 200 gal. per ac. five times between 19 April and 30 May. (The higher concentrations of $MnSO_4$ were slightly more effective than the lower.) Although the increases in yield obtained by applying foliar sprays were highly significant, symptoms of Mn deficiency appeared in the sprayed plants late in the season after spraying had been discontinued. At this stage the Mn status of the sprayed mid-stem leaves was as low as on the control plots, thus reflecting the visual symptoms but not the final yields. The correlation between the Mn content of mid-stem leaves (sampled 5 times between 9 May and 20 June) receiving foliar sprays and final yields of oats was highly significant at the first sampling but became decreasingly significant thereafter. It appeared that 40 ppm. Mn in the dry matter of the mid-stem leaves of oats, measured at the first sampling, was the critical level above which no increase in final yield as a result of Mn treatment was likely to occur.—W.J.B.

896 Staniforth, D. W. and Atkins, R. E. **Effect of 2,4-D on yield and bushel weight of oats.** *Agron. J.* 1952, **44,** No. 11, 587-9, bibl. 12. [Iowa Agric. Exp. Sta., Ames]

In field trials, 10 oat varieties were sprayed with 2,4-D in 1948 at the early boot-stage and in 1949 and 1950 at each of 2 growth stages: (a) at the time of initiation of the floral primordia in the main culm and (b) at the early boot-stage. Three 2,4-D formulations were used as follows: 0.5 lb. per ac. sodium salt, 0.5 lb. per ac. amine salt and 0.25 lb. per ac. butyl ester, all on an acid equivalent basis. The herbicides were applied in 40 gal. of water per ac. In the 1948 trials, spraying at the boot-stage caused no significant grain-yield reductions, compared with controls. In the 1949 and 1950 trials, results were very similar. The 2,4-D treatments made during the time of floral primordia initiation caused significant yield reductions, while the same treatments at the early boot-stage caused no yield reductions in either year. The 2,4-D butyl ester treatment was as injurious as the amine-salt treatment in 1949 and more toxic than the amine-salt treatment in 1950. Least injury was caused by the Na-salt treatment. Bushel-weights were reduced appreciably only in 1949 following treatment with 2,4-D ester at the time of initiation of floral primordia. The varieties Mindo and Colo were most susceptible, and Marion and Clinton least susceptible, to 2,4-D injury, as evidenced by yields.—P.J.B.

RYE

897 Haensel, H. Über die Wirkung des Kurztages auf Zeit des Ährenschiebens und auf Ährchenzahl pro Ähre bei Petkus Winterroggen. [**The effect of short day upon the time of earing and upon number of spikelets per ear in Petkus winter rye.**] *Bodenkultur* 1951, **5,** No. 3, 305-12, bibl. 14, illus.

At the Plant Breeding Institute, Cambridge University, Petkus winter rye R.N. 19 (Inst. Agric. Bot., Cambridge) was vernalized for 76 days at 0°C., sown in pots on 7 January, 1950, and on emergence was exposed to 1, 2, 3, 4 and 5 weeks' 8-hour short day followed by 16-hour long day, and was also grown under continuous long day and continuous (= 22 weeks) short day. Under continuous long-day conditions earing took place in 55 days, under continuous short day in 155 days. The average number of spikelets per ear on the main stem under continuous short day was approximately double that produced under continuous long-day (39.6 as against 19.2). The delay in earing due to short-day treatment when graphed followed a straight line and amounted to 4-4.5 days per week of the treatment, and this held good for continuous short day also. The increase in the number of spikelets per week of short-day treatment followed a straight line for the first 5 weeks (2 to 3 spikelets per week short day), and then fell abruptly to the continuous short day. The analysis of covariance of length of axis to number of spikelets per ear showed that axis growth "within" and "between" the different treatments was related to the same spikelet increase and no elongation of the axis segments took place as a result of short-day treatment. It is pointed out that short day: (a) encourages readiness to shoot and to set flower primordia, but inhibits their further differentiation and the shooting process itself; (b) like vernalization, can gradually eliminate the inhibition of shooting, but in this has a different effect from that of vernalization on the setting of leaf and flower primordia. The importance of natural short day for number of grains per ear, and the possibility of modifying this character before shooting, is discussed. In growing a generation of winter cereal during the winter in a hothouse, a short-day treatit of several weeks, after vernalization of the l, can increase the number of spikelets per ear, rein the gain of 2-3 spikelets on the main stem responds to a loss of 4-5 days before earing takes ce.—G.M.R.

SCHIEMANN, E. and NÜRNBERG-KRÜGER, U. Neue Untersuchungen an *Secale africanum* Stapf. 2. *Secale africanum* und seine Bastarde mit *Secale montanum* und *Secale cereale*. [**New research into *Secale africanum*. 2. *Secale africanum* and its hybrids with *Secale montanum* and *Secale cereale*.**] *Naturwissenschaften* 1952, **39,** No. 6, 1-3, bibl. 4, illus.

RLEY

MUNTONA, LTD. and FISON, E., LTD. **Monographs on malt and malt products. The production of barley for malting.** 1953, pp. 26, bibl. 28, illus. [Bedford and Ipswich]

knowledge acquired to date on the germina-, cultivation and improvement of barley in Gt tain is presented in concise, factual form with emphasis on malting rather than feeding lities. The economic value of a barley based on extract obtainable from the finished malt can predicted from a formula which uses N-content 1000-grain weight, both values being expressed a dry-weight basis. A distinction is made be-en brewing quality and malting quality of ey.—C.L.S.

SHANDS, H. L. and DICKSON, A. D. **Barley—botany, production, harvesting, processing, utilization and economics.** *Econ. Bot.* 1953, **7,** No. 1, 3-26, bibl. 15, illus. [Agron. Dep., Univ. Wisconsin, Madison]

s is a brief review of different aspects of the ey crop, with particular reference to the USA. uded also is a section on the major fungous ases and insect pests of the crop.—P.J.B.

BJAANES, M. Forsøk med toradsbygg på Møystad forsøksgard og på spredte felter i distriktet 1947-51. Domen 01435, en ny stråstiv torads sort. [**Trials with 2-row barley varieties at Møystad Experimental Station and at adjacent locations during 1947-51. Domen 01435, a new, stiff-strawed, 2-row barley variety.**] *Forskn. Fors. Landbr.* 1952, **3,** No. 4, 273-97, bibl. 8, English summary pp. 295-7. [Statens Forsøksgard, Møystad, Norway]

results are given of trials with the 2-row barley eties Maja, Opal B, Domen, Freja, Ymer and iat and the 6-row variety Varde during 1947-51, with the 2-row barley Herta during 1949-51. trials were laid out at 24 locations near Lake Mjøsa in east central Norway. Average grain yields from all plots during the trial period for Maja, Opal B, Domen, Freja, Ymer, Goliat and Varde were 344, 334, 335, 349, 359, 301 and 308 kg. per decare, respectively. The numbers of days to maturity were 89 for Varde, the earliest-maturing variety, and 103, 104, and 105 for Maja, Ymer and Domen, respectively. Highest straw yields were given by Domen, with an average of 466 kg. per decare, followed by Goliat, 438 kg. and Opal B, 423 kg. per decare. The grain yields of Ymer were significantly higher than those of any other variety. The yields of Domen and Varde varied more from location to location than those from the other varieties. In a limited number of trials, Herta gave yields comparable with those of Maja, Freja, Ymer and Domen and was only inferior to Domen in terms of straw-stiffness. Where the yields of the different varieties were divided into 3 groups according to the soil fertility of the test location, in the low-yield group, the grain yields of Maja, Ymer, Freja and Domen averaged 270, 276, 270 and 233 kg. per decare, respectively. On plots in this group, no lodging occurred. In the high-yield group, the yields of Maja, Ymer, Freja and Domen were 422, 441, 434 and 436 kg. per decare, respectively. Lodging in Domen affected about 10% of the crop, compared with 43% for Maja and 38% for Ymer. In trials to determine the effect of N treatment on the different varieties, 150 kg. per ha. of calcium nitrate raised the mean yield of all varieties from 335 to 414 kg. per decare. The response of Domen to the N treatment was somewhat greater than that of the other varieties, owing to its stiff-strawed character. A description is given of each variety. Domen 01435 is the product of a cross between the 6-row variety Maskin and the 2-row variety Opal, made at the State Experiment Station at Møystad. On soils of low, or moderate fertility, it is not among the highest-yielding varieties, apparently owing to its poor tillering. On fertile soils, it yields well because of its resistance to lodging.—P.J.B.

902 NYBOM, N. and others. **On the injurious action of ionizing radiations in plants.** *Bot. Notiser* 1952, No. 4, 344-65, bibl. 42.

The studies reported concern the lethal and growth-inhibiting effect of X-rays and fast neutrons on dry, dormant and pre-soaked, germinating barley seed. With X-rays, dry, dormant seed was 6 to 7 times less sensitive than germinating seed, and 20 to 30 times more sensitive to fast neutrons than to equal doses of X-rays. Germinating seed was 2 to 3 times more sensitive to fast neutrons than was dry, dormant seed. X-ray injury appeared to be partly due to indirect factors and depended on the physiological state of the seed. Fast neutron injury was largely direct in character and was not greatly affected by physiological factors.—P.J.B.

903 Ayers, A. D. **Germination and emergence of several varieties of barley in salinized soil cultures.** *Agron. J.* 1953, **45,** No. 2, 68-71, bibl. 8.

The effect of osmotic pressure of salinized soil solutions was observed on the germination of 30 varieties of barley. It was found that there were significant differences of possible agronomic importance in the salt tolerance of the varieties tested.—M.A.

904 Grigorjeva, V. G. [**The influence of low temperature of the soil on the development of barley.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, **20,** No. 2, 14-18, bibl. in text, illus. [Obručev Inst. Frozen Earth, USSR Acad. Sci., Moscow]

[See also *Fld Crop Abstr.* 4 : 1193.] A study has been made of the effect of low temperature of the soil (2-3.5°C. compared with 15-25°C. in controls) on the duration of different phases of development in barley ears. Tabulated data show the effect on inflorescence development of these low temperatures : (a) at the time of cell differentiation in the spikelet's apex ; (b) at the phase of spikelet protuberance ; (c) at the phase of floret formation (initiation of sexual cells) ; and (d) during the course of the whole period of vegetative growth. The soil temperature at these 4 stages of the plant's growth is correlated with : (1) number of spikelet primordia on a single plant ; (2) number of ripened seeds per plant ; and (3) percentage of ripe seed compared with the total number of spikelet primordia per plant. The data show that low temperature of the soil prolongs the vegetative period in barley, and changes early-ripening types to late-ripening types.—M.H.

905 Mueller, D. Analyse der Stoffproduktion von Gerste. [**Analysis of the production of matter in barley.**] *Bodenkultur* 1951, **5,** No. 2, 129-35, illus. [Copenhagen]

The "production of matter" in growing plants is defined as the difference between the increase in dry matter and the loss in dry matter incurred, e.g., through respiration and loss of leaves. Barley was grown in pots which were placed in larger pots dug into a normally sown field of barley. The smaller, experimental pots were thus removable and were studied daily for photosynthesis and respiration in an apparatus which is described and illustrated. The effect of different light intensity was taken into account. The greater the production of matter, the more was it limited by the light factor. The production of matter is a function of, but is not proportional to, the leaf area. Barley stands with a maximal leaf area (approximately at the time of shooting into ear) do not exhibit maximal photosynthesis until there is a light intensity of over 50,000 lux.—G.M.R.

906 Hunter, H. **High protein feeding barley.** *Agriculture, Lond.* 1953, **59,** No. 11, 536-40, bibl. 3.

Means of increasing the yield and protein content of malting barley grown for stock feeding are considered. About 25% of the total annual production of barley in Britain is used for stock feed, but since most of the varieties grown are destined for malting, the protein content of the grain, which usually varies between 9 and 10%, is low for a feeding grain. There appears to be little chance of breeding for high protein content, since 6-row and 2-row feeding barleys and malting barleys tested at Cambridge have all had a similar protein content. It appears to be impossible as yet to combine high grain yields and high protein content in the grain. Trials in which 1 cwt. per ac. of sodium nitrate was applied to malting barley have shown that applications made at sowing resulted in a slight reduction in the protein content of the grain, but an increase of between 14 and 50% in grain yields over 3-years' trials, compared with untreated controls. Similar N treatments made when the ear was emerging from the leaf sheath resulted in increases of about 2% in the protein content of the grain, but only small increases in grain yields, compared with controls. Split applications of 1 cwt. per ac. of sodium nitrate made at sowing time and 1 cwt. per ac. at ear emergence resulted in protein-content increases in the grain of about 2%, and 3-10% higher grain yields than where one application of N was made at sowing. By the use of split applications of quick-acting N manure, it is possible to combine high grain yields and high protein content in the grain, without undue risk of lodging. The practical difficulties of applying N at the second growth stage are noted.—P.J.B.

MAIZE

907 Arvier, A. C. and Pink, H. S. **Maize-growing in the South Burnett** [**Queensland**]. *Qd agric. J.* **75,** No. 5, 275-87, illus.

908 Fenaroli, L. Rapporto sulla sperimentazione maidicola 1951. [**Report on experiments with maize in 1951.**] *Publ. 71. Bergamo Sta. sper. Maiscolt.* 1952, pp. 49, bibl. 56, illus.

Information is given on climatic conditions affecting maize cultivation in Italy in 1951. The total maize production in that year was 27,497,440 q. obtained from 1,267,400 ha., an average yield of 21.7 q./ha. Hybrid maize was grown on about 7.5% of the total maize area, the hybrids more widely grown being : Iowa 4316, Wisconsin 464, US 13, Funk's G 114, Funk's G 19, Maygold 99 A, Maygold 49, U 41 and U 32. The total production of hybrid maize seed in Italy in 1951 was 33,000 q. The

Station supervised 32 experimental fields in which trials were conducted to study adaptation and productivity. A schematic account of these trials is given as well as a list of the hybrids and varieties tested. A list is given of the maize hybrids and local varieties tested in northern Italy during 5 years 1947-51) showing their average yield. Some results are given of trials carried out to study the life cycle of several maize types sown at different dates, at different latitudes, in Italy. [See also *Fld. Crop Abstr.* 5 : 1103.]—E.B.O.

909 ROSSMAN, E. C. **Michigan 480—a new corn hybrid.** *Quart. Bull. Mich. agric. Exp. Sta.* 1953, **35,** No. 3, 288-93.

Michigan 480 maize was released in 1952. The reults are given of yield trials in Michigan, in which Michigan 480 yielded an average of 81.6 bu. per ac. over a 5-year period, compared with 82.5 and 80.5 or Michigan 20D and 29D. It has also outyielded Michigan 350 over a 3-year period. Michigan 480 s adapted as a medium-early hybrid for grain or silage in southern and south-central Michigan and as a full-season hybrid in north-central Michigan. t is designated as 105-day relative maturity.—P.J.B.

910 BROOKS, J. S. and others. **Oklahoma 301. A new hybrid corn for Oklahoma.** *Bull. B*-390. *Oklahoma agric. Exp. Sta.* 1953, pp. 6.

Oklahoma 301 was produced from a double cross C.I. 21E × K201) × (Okla 12 × Kys) and is a ate-maturing, yellow maize; adapted to Oklahoma onditions on soils capable of producing over 50 bu. of grain per ac. It has exceeded the yield of other recommended hybrids in its class at all but 2 ocations. It has good resistance to lodging and has high-quality ears.—P.J.B.

911 BAUMAN, L. F. and others. **Experimental corn [maize] hybrids. 1952 tests.** *Bull. 563. Illinois agric. Exp. Sta.* 1953, pp. 19.

912 PENDLETON, J. W. and others. **1952 Illinois corn tests. Variety performance, seed treatment, rate of planting.** *Bull. 564. Illinois agric. Exp. Sta.* 1953, pp. 32, illus.

A number of seed-treatment materials for maize have compared well with Arasan SF-X (75% etramethythiuram disulphide). They include: Spergon DDT-SL (92% tetrachloroparabenzoquinone), C&C 5400 (100% dimethyl dithiocarbamate - sulphur dichloride), Orthocide 406 50% N-trichloromethylthio tetrahydrophthalimide) and Vancide 51 (30% Na salts of dimethyl dithiocarbamic acid + 2-mercapto benzothiazole n water), though none was significantly better than Arasan SF-X. Summaries are given of 3-years' yield trials with maize hybrids in 5 different regions of Illinois.—P.J.B.

913 ANDERSSON, G. and LÖÖF, B. Redogörelse för försöks- och förädlingsarbeten med majs vid Sveriges Utsädesförening. [**Report on research and breeding work on maize by the Swedish Seed Association.**] *Sverig. Utsädesfören. Tidskr.* 1952, **62,** No. 4, 323-45, bibl. 19, illus., English summary pp. 341-3.

In trials with a number of European open-pollinated and American hybrid maize varieties at 2 locations in south Sweden during 1948-51, the earliest American hybrid did not mature grain beyond the milk-ripe stage (stage 5 on a scale 1 to 10, in which 10 denoted complete maturity). This was hybrid W. 1600, a 70-day (relative maturity) variety. Manalta, an early, open-pollinated Canadian variety ripened grain to stage 8. The varieties Manalta, Eagle Hill (Danish) and Pfarrkirchner (German) and the hybrid W. 1600 were the only varieties to ripen grain as far as stages 5 to 6, at which stages the plants were considered suitable for ensiling. The major part of this paper deals with yield trials with these and other varieties, grown for silage.—P.J.B.

914 FENAROLI, L. Le introduzioni di piante e semi eseguite dalla Stazione Sperimentale di Maiscoltura nel 1951 (nn. 51001-51472). [**The plants and seeds introduced by the Experimental Station for Maize Cultivation in 1951 (Nos. 51001-51472).**] Suppl. *Ann. Sper. agr.* 1953, **7,** No. 1, 1-24. [Sta. Sper. Maiscolt., Bergamo, Italy]

915 BIANCHEDI, A. Mais ibridi e varietà locali. [**Maize hybrids and local (Italian) varieties.**] *G. Agric. Domen.* 1952, **62,** No. 31, 236.

In 3-years' trials, in which hybrid maize was compared with local varieties on different types of soil in Treviso Province, Italy, the white-dent hybrids Indiana 750 A and Embro 155, and the yellow-dent U 41, Maygold 99 A and Maygold 49 yielded 15 to 40 % more grain than the local varieties.—E.B.O.

916 LAUBSCHER, F. X. and others. **Performance of maize varieties in the Highveld region [S. Africa].** *Fmg in S. Afr.* 1953, **28,** No. 323, 47-51, 64, illus.

917 KERLE, W. D. **Maize hybrids and varieties. District recommendations for 1952 sowing.** *Agric. Gaz. N.S.W.* 1952, **63,** No. 6, 286-9.

918 WELLHAUSEN, E. J. and others. **Races of maize in Mexico. Their origin, characteristics and distribution.** *Publ. Bussey Inst. Harvard Univ.* 1952, pp. 223, bibl. 58, illus.

This publication was compiled under the auspices of the Rockefeller Foundation, with the object of providing an inventory of the maize breeding material available in Mexico. An account is given of the antiquity of maize in Mexico and the characters used in classifying maize types, together with detailed descriptions of the races of maize so far found. The descriptions include illustrations of the ears, plants and tassels ; also the external and internal characters of the ears. The distribution, origin and relationships of each race are given.—P.J.B.

919 NEPTUNE, G. and ROSSMAN, E. C. **Cold test germination of hybrid seed corn.** *Quart. Bull. Mich. agric. Exp. Sta.* 1953, **35,** No. 3, 343-50, bibl. 20.

The seed of 118 maize hybrids entered in the 1950, and of 120 hybrids entered in the 1951, Michigan hybrid maize trials were tested in 1951 for their ability to germinate in flats in soil saturated with water and held at 45°F. for 12 days before being transferred to 70-80°F. for 13 days. In standard germination tests, all seed had a germination percentage of over 94%, the average value being 98%. Under the cold-test conditions, the germination percentages of the samples of new (1951) seed ranged from 19 to 99, the average being 80, while in the case of 1-year-old seed, germination percentages ranged from 1 to 86, with an average of 47. The seed of certain hybrids had an inherently high capacity for germinating under cold-test conditions. —P.J.B.

920 LEONTI, F. Le onde ultrasoniche sullo sviluppo delle piante. [**The effect of ultrasonic waves on plant development.**] *Ital. agric.* 1952, **89,** No. 11, 754-61, bibl. 12, illus.

Different lots of maize seeds of the variety Nostrano dell'Isola were treated under water with ultrasonic waves for 0, 5, 10, 15, 20, 30, 45 and 60 min., respectively. Before treatment these seeds had been soaked in water for 48 hr. Maize seedlings 1 cm. long were also treated with ultrasonic waves for 10 and 45 min. Results from these trials showed that : (a) the germination percentage of seeds treated for 5, 15 and 30 min. was slightly higher than, and that of the seeds treated for 10 and 20 min. about the same as, that of the controls ; (b) the germination energy of seeds treated for 5 to 30 min. was better than that of the controls ; (c) the growth in the first few days after treatment of the seedlings from seeds treated for 5 to 30 min., was better than that of the controls, and so was the growth of the seedlings treated for 10 min. when 1 cm. long ; (d) ultrasonic waves applied for 45 and 60 min. consistently inhibited plant growth.—E.B.O.

921 HANSEN, J. R. and BUCHHOLTZ, K. P. **Absorption of 2,4-D by corn and pea seeds.** *Agron. J.* 1952, **44,** No. 9, 493-6, bibl. 7. [Wis. Agric. Exp. Sta., Madison]

Studies were made of the absorption of the Na salt of 2,4-D by pea and maize seeds in solutions, buffered at pH values of 4, 5, 6, 7 and 8, containing 500 ppm. Na 2,4-D acid equivalent. The seeds were soaked in the solutions for 20 hr. Both maize and pea seeds absorbed much more 2,4-D at a pH of 4 than at a pH of 7. Pea seeds continued to absorb 2,4-D, even after their maximum level of water absorption was reached. Pea seeds absorbed more 2,4-D than did maize seeds on an equivalent seed-weight basis, and also where the weights of pea and maize seeds were so adjusted that equal volumes of water were imbibed. The seeds of different maize hybrids differed significantly in the amount of 2,4-D absorbed, though these differences were not related to their respective tolerances to 2,4-D in the field.—P.J.B.

922 MONTENEGRO, W. S. and KRUG, H. P. O tratamento de pré-emergência com o 2,4-D no milho. [**Pre-emergence treatment of maize with 2,4-D.**] *Ann. Esc. Agric. Queiros* 1951, **8,** 369-80, bibl. 9, illus., English summary p. 379.

The herbicides TCA, 2,4,5-T and the sodium and amine salts and the ester of 2,4-D were applied to plots 4 days after the sowing of flint maize. The effect of different concentrations of the various herbicides on the growth of the weed population, and on the development and yield of the maize plants, was studied. The composition of the weed population, as it existed before cultivation for the maize crop took place, is described. All treatments were highly significant in their effect on broad-leaved and grass weeds, compared with the control plots, except TCA in a low concentration (0.6%) in respect of broad-leaved weeds and 2,4-5-T in a low concentration (0.15%) in respect of grass weeds. The amine 2,4-D in a low concentration (0.25%) applied at a rate equivalent to 600 g. acid 2,4-D per ha. gave excellent control of both types of weed. TCA at a high concentration (1.2%), had a detrimental effect on the germination, growth and yield of the maize.—W.J.B.

923 RODGERS, E. G. **Brittleness and other responses of corn to 2,4-dichlorophenoxyacetic acid.** *Pl. Physiol.* 1952, **27,** No. 1, 153-72, bibl. 12, illus. [Univ. Florida, Gainesville]

Effects were studied with two concentrations of 2,4-D (0.5 and 1.0 lb. per acre) on 4 strains of maize at 8 different growth stages, the stages being indicated by the number of leaves expanded. The primary purpose was to study stalk brittleness as a response to treatment. Only 2 of the 4 strains were susceptible to brittleness but whenever there was a response it was greater following the higher rate of application of 2,4-D. Reductions in yield were obtained in all strains when treated at the rate of 1 lb. per acre, but while in some strains yields were most everely reduced by early applications of 2,4-D, in ther strains the yields were most strongly reduced y late applications. Seed viability was reduced in wo of the strains ; it was reduced most markedly t the 1 lb. rate of application and when applied t the stage of tassel emergence. The greatest reduc- on in seedling vigour occurred in seed from plants eated at the early tassel stage. The degree of hange brought about in the plants was influenced y the stage of plant development at which 2,4-D as applied. From a study of these stages it is con- uded that, for weed control in maize fields, 4-D should be applied before the 6-leaf stage or etween the 11- and 16-leaf stages if injury to the op is to be minimized. An inhibited seed-set with sulting decreased seed-yield may follow if treat- ent is applied at the 16-leaf and early-tassel ages. Two strains (WF 9 and WF 9 × Os 420) are mparatively tolerant to 2,4-D, but the other two V22 and W22 × M14) should not be sprayed, rticularly during susceptible growth stages, less a still larger reduction in yield is expected om heavy weed competition.—D.B.

24 MARSHALL, E. R. **Planting and emergence application of a water-soluble dinitro and CMU to field corn.** *Proc. 7th N.-E. Weed Contr. Conf. 1953* 1953, 169-73. [G.L.F. Soil Bldg Serv., Ithaca, N.Y.]

f a number of materials tested as pre-emergence rbicides for maize, Sinox PE (water-soluble nitro formulation) and CMU gave the best results. rther studies were made of the effectiveness of nox PE and CMU applied at the time of sowing d at the time the maize emerged. Applications Sinox PE at rates of 3-9 lb. per ac. and CMU at tes of 1-2 lb. per ac. were effective at both times application. Weed control was somewhat better llowing treatment at maize emergence, compared th treatments at sowing time, particularly in the se of Sinox PE. Relatively high rates of applica- on of both materials were necessary where treat- ents were made at sowing time. Sinox PE was ore practicable for use with low-volume weed rayers than was CMU ; also, critical rates at hich injury to the maize resulted were less well- fined than in the case of CMU.—P.J.B.

5 EDEN, W. G. **Effects of kernel characteristics and components of husk cover on rice weevil damage to corn.** *J. econ. Ent.* 1952, **45,** No. 6, 1084-5, bibl. 2. [Alabama Polytech. Inst., Auburn]

here was an indication that damage to maize at rvest caused by the rice weevil, *Sitophilus oryzae,* as greater as the length of the husk tip, the mber of leaves per husk and the degree of hard- ss of the kernel pericarp decreased.—E.B.O.

6† HÉDIN, L. and LEFEBVRE, J.-M. Recherches sur la caractérisation chimique d'espèces ou de variétés de plantes fourragères et prairiales. [**Research on the chemical characterization of species or varieties of forage and herbage plants.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. B. Ann. Amélior. Pl.* 1952, **2,** No. 1, 55-98, bibl. 14. [Sta. Agron., Rouen]

In the same maize variety (Étoile de Normandie) grown at Rouen, the last and the penultimate leaves below the male inflorescence of plants sown on 8 June were sampled and studied for mineral content at intervals of 8 days from 27 July, the day when the stamens appeared, to 29 September, the date when, after the ripening of the ear, the plants began to wither. The percentages of N, P_2O_5, K_2O, CaO, and SiO_2 in the dry matter on the 10 dates of sampling are tabulated and (a) the development of these elements in the leaves during the period of sampling and (b) the correlations existing between the different mineral contents, are discussed. Some correlations were found to vary with age, others maintained a certain stability and on this basis an attempt was made to characterize 5 maize varieties, some French, some American hybrids, grown side by side at Yvetot. Of the four leaf positions tested, the last leaf below the male inflorescence was found to give the most reliable indications of chemical composition for the purpose of varietal identification.—G.M.R.

927 DUVICK, D. N. **Free amino acids in the developing endosperm of maize.** *Amer. J. Bot.* 1952, **39,** No. 9, 656-61, bibl. 20, illus.

Kinds and amounts of free amino acids and amides in the developing endosperms of four morphologically dissimilar varieties of maize were studied. The amounts, relative proportions and changes in the relative proportions were shown to be similar among all varieties. A characteristic reversal at mid-grain maturity, of the ratio of glutamic plus aspartic acids and serine to alanine, occurred in 3 of the varieties tested.—From author's summary.

928 MILLER, P. A. and others. **Relationship of lysine and niacin with the crude protein and certain protein components in corn grain.** *Agron. J.* 1952, **44,** No. 7, 343-5, bibl. 14. [Iowa Agric. Exp. Sta.]

Protein from the endosperm portion of maize grain is deficient in two essential amino-acids, tryptophane and lysine. Maize grain is also deficient in niacin which assists the utilization of tryptophane in the animal body. Grain samples from varieties of maize with high, low and intermediate protein contents, were subjected to a detailed protein analysis. It was found that lysine became a decreasing proportion of maize protein as the total percentage of crude protein in the grain increased. Increases in lysine were associated with increases in other protein components such as tryptophane. A high percentage of zein was present in high-protein maize. The relationship between lysine and zein contents was variable, less than 40% of the variation in lysine percentage being accounted for by the variation in zein percentage. The percentage of niacin in maize was apparently independent of the percentages of the protein components. It was concluded that breeding for high protein content in maize in the past had resulted in a low-quality protein containing a high proportion of zein and low proportions of lysine, tryptophane and niacin. In future, in order to improve the quality of protein in maize, it might be desirable to select maize varieties for high percentages of lysine, tryptophane and niacin rather than for a high crude-protein content.—W.J.B.

929 VAN REEN, R. and SINGLETON, W. R. **Sucrose content in the stalks of maize inbreds.** *Agron. J.* 1952, **44,** No. 12, 610-14, bibl. 13, illus.

Five maize inbreds were sampled for sucrose content at : (a) late whorl stage, (b) late green-tassel stage, (c) mid-silk stage, (d) 1 week after pollination, (e) 3 weeks after pollination, (f) 5 weeks after pollination. The highest sucrose content in the stalk was found in Connecticut 103 inbred, which attained a figure of 12% at stage (e), 60 days after stage (a). Where the ear was removed, the sucrose content reached 15% at stage (f). The maximum sucrose content was reached at stage (e) in all cases where the ears were left on the plants. Stalks without ears reached higher sucrose contents than those with ears and also maintained their sucrose content for longer periods. The sucrose content increased significantly from the second internode to the ear internode, with little or no increase beyond this point. There was a good correlation in each inbred between Brix readings and sucrose content, though the reliability of Brix readings was less in inbreds with a relatively high proportion of hexose sugars in their total sugar content. Not all the differences in sucrose content between the inbreds tested were related to the amount of grain produced ; C-103, which had the highest sucrose content, produced as much grain as any other inbred, except one.—P.J.B.

930 GLOVER, J. **The nutrition of maize in sand culture. 1. The balance of nutrition with particular reference to the level of supply of nitrogen and phosphorus.** *J. agric. Sci.* 1953, **43,** Pt. 2, 154-9, bibl. 4, illus. [E. Afr. Agric. For. Res. Org.]

Experiments with the nutrition of maize in sand culture have shown that if all other nutrients are supplied in adequate amounts for good growth and supplies of potassium range between 5 and 45 ppm. of solution, then the level of balance of the nitrogen and phosphorus supplies determines the size, yield and earliness of flowering of the plant. During the vegetative phase, if nitrogen restricts growth then excess phosphorus over and above that required to balance the nitrogen supply is of little or no value in increasing yield of tops, though phosphorus accumulates in the plant. Likewise, if phosphorus restricts growth during the vegetative phase, more nitrogen than is required to balance it is of no value in increasing yield of tops. Between tasselling and harvest, differences in maturation period affect the response to certain levels of nutrition, for during the slower maturation of apparently less well-nourished plants they can, by reason of a longer period of uptake of nitrogen, reach grain yields nearly as high as those of well-nourished plants which have matured earlier. When the balance of nutrition was maintained at such a low level that the plants only grew very slowly, no visual deficiency symptoms were observed. However, if balance at this low level was upset by additional supplies of either nitrogen or phosphorus, then visual symptoms of the nutrient in minimal supply were observed.—Author's summary.

931 GLOVER, J. **The nutrition of maize in sand culture. 2. The uptake of nitrogen and phosphorus and its relevance to plant analysis.** *J. agric. Sci.* 1953, **43,** Pt. 2, 160-5, bibl. 4, illus. [E. Afr. Agric. For. Res. Org.]

Studies of the uptake of nitrogen and phosphorus by maize grown in sand culture show that in general the consumption of both increases as the plant grows in size up to the stage of tasselling and silking. Thereafter the consumption of nitrogen decreases during the setting and ripening of grain and quickly falls off to a very low level before harvest ; the consumption of phosphorus, on the other hand, continues at a high level right through to harvest. The relevance of the results to plant analysis as a method of diagnosing deficiencies in nutrition is discussed, for they appear to show that measurement of the total phosphorus content in the tops of young plants is likely to be a guide to the availability of phosphorus in the soil. Measurements of the percentage phosphorus content in the plant seemed to be useless for this purpose.—From author's summary.

932 UNITED STATES DEPARTMENT OF AGRICULTURE. **Drying shelled corn [maize] and small grain with heated air.** *Leafl. 331. U.S. Dep. Agric.* 1952, pp. 12, illus.

933 UNITED STATES DEPARTMENT OF AGRICULTURE. **Drying shelled corn [maize] and small grain with unheated air.** *Leafl. 332. U.S. Dep. Agric.* 1952, pp. 10, illus.

934 UNITED STATES DEPARTMENT OF AGRICULTURE. **Drying ear corn [maize] with heated air.** *Leafl. 333. U.S. Dep. Agric.* 1952, pp. 16, illus.

35 UNITED STATES DEPARTMENT OF AGRICULTURE. **Drying ear corn [maize] with unheated air.** *Leafl. 334. U.S. Dep. Agric.* 1952, pp. 16, illus.

WEET CORN

36 BOSWELL, V. R. **Commercial growing of sweet corn.** *Fmrs' Bull. 2042. U.S. Dep. Agric.* 1952, pp. 29, illus.

Notes are given on the climatic and other requirements of sweet corn and recommendations are made for the cultivation of the crop in the USA. A ist of varieties suited to the different regions of the USA is provided.—P.J.B.

37 LANA, E. P. and HABER, E. S. **Seasonal variability as indicated by cumulative degree hours with sweet corn.** *Proc. Amer. Soc. hort. Sci.* 1952, **59,** 389-92, bibl. 7. [Iowa Agric. Exp. Sta., Ames]

Studies were made during 1938-50 on the seasonal variability in the value of the degree-hour method or predicting the dates of harvest of a number f sweet corn hybrids. This method uses the ollowing formula to find the daily degree-hour value: the mean of the maximum and minimum daily temperatures in degrees Fahrenheit, minus 50, multiplied by 24. The value 50 refers to the basal emperature for the minimum growth of sweet orn, i.e. 50°F. The daily degree-hours given by the above formula over the whole growing season are totalled to give the cumulative degree-hour value. The data from these studies showed that during seasons only out of 12 did the degree-hour method give accurate results; during the remainder of the easons, the method was not accurate enough to be of value to canners. The degree-hour requirement of rops appeared to be less under cool than under warm conditions.—P.J.B.

38 JOHNSON, W. B. and BENNETT, E. **A turbidity test for measuring the maturity of sweet corn.** *Proc. Amer. Soc. hort. Sci.* 1952, **59,** 400-4, bibl. 8. [Mass. Agric. Exp. Sta., Amherst]

The turbidity test described makes use of a spectrophotometer to determine the percentage of light ransmitted through water suspensions of material obtained by passing sweet corn ears through a Waring blender. The test has proved reliable, reproducible and rapid. The sweet corn variety used in he tests was Golden Bantam, but it is thought that he test can be used with other varieties, and possibly other crops. The results are given of imited trials on the use of pre-harvest sprays of p-chlorophenoxyacetic acid for delaying the further maturation of sweet corn ears that have reached their optimum condition for canning. As judged by the results of turbidity tests, this material was of little value in delaying ear maturation.—P.J.B.

939 HUELSEN, W. A. and BROWN, W. N. **Physical damage to sweet corn caused by mechanical harvesting and subsequent processing.** *Bull. 561. Illinois agric. Exp. Sta.* 1952, pp. 45, bibl. 15, illus.

Studies in Illinois showed that mechanically-harvested sweet corn seed did not germinate as well as hand-harvested seed. No optimum moisture content was established at which sweet corn seed could be harvested so as to suffer the least damage. Endosperm cracking was noted in all samples and apparently occurred during the maturation period. Where not accompanied by external damage, such cracks did not appear to affect germination. Combine harvesting of seed resulted in such a high incidence of damaged kernels and low germination that this method of harvesting could not be recommended; damage caused by combine harvesting increased as the moisture content of the seed fell below 15%. Shelling caused the greatest incidence of kernel damage during the course of processing. It is pointed out that no machines have yet been designed specifically for use with sweet corn. Shelling of seed with moisture contents below 9% resulted in severe damage. Notes are given on damage caused by fanning mills, green-ear and dried-ear sorting and warehouse storage of sweet corn. Recommendations for reducing damage to seed during harvest and subsequent processing are given.—P.J.B.

940 WENE, G. P. and others. **Relation of corn earworm resistance in sweet corn to efficiency of insecticide sprays.** *J. econ. Ent.* 1952, **45,** No. 6, 931-3. [Texas Agric. Exp. Sta.]

941 PAUL, D. L. and others. **The relation of sulfur content of sweet corn to its stage of maturity.** *Proc. Amer. Soc. hort. Sci.* 1952, **59,** 393-9, bibl. 5. [Iowa Agric. Exp. Sta., Ames]

In studies on the value of the S content of sweet corn as an index of its fitness for harvesting, determinations were made of the S content of 5 varieties, harvested at 4-5 day intervals during the harvest season, as shown indirectly by microbiological assay of the methionine and cystine content of the plants [part of plant used not stated, but was, presumably, the ear]. The results showed that the S content per unit of sweet corn, as expressed on a dry-matter basis, did not change as the plants matured. On a fresh-weight basis, the S content of the plants increased in proportion to the rise in the dry-matter content of the plants with increasing maturity. It was concluded that the S content of a given fresh-weight unit of sweet corn could be used to determine the maturity of the crop if a sufficiently sensitive test for S existed.—P.J.B.

MILLET AND SORGHUM

942 Jakimenko, A. F. [**Ripening of millet and harvesting the crop.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 10, 55-60. [Dep. Pl. Husb., Harjkov. Agric. Inst.]

The characteristic features of proso millet [*Panicum miliaceum*] which detract from its value as a crop are the uneven ripening of the grain on the panicles, the uneven development of inflorescences in a plot, and grain shedding. A study of the growth processes in proso under different kinds of sowings (close- and wide-rowed spacings) was made at the above Institute during 1947-50. Observations were made on grain characteristics with special regard to: (1) the influence on grain quality of growth processes which precede grain formation; and (2) grain yield obtained under different harvesting dates. It is concluded that breeding work should be directed to the production of proso types in which ripening in a panicle is more uniform, and that cultural measures should be worked out by which the duration of the process of panicle emergence (usually 18-20 days) can be curtailed.—M.H.

943 Tourte, R. Préparation du sol et enfouissement de la végétation naturelle comme engrais vert. Leur influence sur les rendements du mil au Sénégal. [**The influence on millet (*Pennisetum* and *Sorghum*) yield in Senegal of preparing the soil and ploughing under the natural vegetation for green manure.**] *Bull. agron. Minist. Fr. d'out. mer* 1952, No. 7, 120-5, bibl. 1. [Cent. Rech. Agron., Bambey, Senegal]

944 Corriols, F. and Tourte, R. Contribution à l'étude de la fumure du mil (*Pennisetum*) au Sénégal. [**A contribution to the study on the manuring of millet (*Pennisetum*) in Senegal.**] *Bull. agron. Minist. Fr. d'out. mer* 1952, No. 7, 45-52, illus. [Cent. Rech. Agron., Bambey, Senegal]

945 Leukel, R. W. and others. **Sorghum diseases and their control.** *Fmrs' Bull. 1959. U.S. Dep. Agric.* 1951, pp. 50, illus. [Received 1953]

The most important diseases of sorghum in the USA are reviewed, with illustrations of their symptoms. Recommendations are made for their control.—P.J.B.

946 Wahhab, A. and Shah, Z. H. **Effect of liming on the absorption of calcium, phosphorus and nitrogen by sorghum plant in alkaline soils.** *Agron. J.* 1952, **44,** No. 12, 621-4, bibl. 8. [Punjab Agric. Coll. and Res. Inst., Lyallpur, Pakistan]

Studies were made on the uptake of CaO, P_2O_5 and N by sorghum plants at different growth stages, grown on a soil with a pH value of 7.5-8.5. The soil had a low content of N, P and organic matter and its high pH value was largely due to its Na content. Its Ca content was sufficient for satisfactory plant growth. The soils were treated with 1500 lb. per ac. of lime, 125 lb. superphosphate, 125 lb. superphosphate + 1500 lb. lime, 100 lb. N in farmyard manure and 100 lb. N in farmyard manure + 1500 lb. per ac. of lime. Green fodder yields were 17,576 lb. per ac. for untreated controls, compared with 18,293, 19,609, 19,609, 18,771 and 18,532 lb. per ac. following the treatments given above in that order. No yield increase following treatment was significantly higher than the control yields. Lime, alone, increased the CaO uptake of the plants at all growth stages, compared with controls, though CaO accumulation was much greater in the stems than the leaves or grain. Lime also increased P_2O_5 uptake at all growth stages, the P_2O_5 accumulation being greater in the leaves than the stems. Lime increased N uptake, this possibly being due to enhanced N fixation in the soil by bacterial activity stimulated by the lime applications. P_2O_5 uptake was greater where superphosphate was used alone, than when used with lime. Lime + farmyard manure markedly increased CaO uptake at almost all growth stages, when compared with CaO uptake following farmyard manure treatment, alone. Lime + farmyard manure increased P_2O_5 uptake somewhat, but was rather variable in this respect. From these results, it was evident that combining lime with superphosphate, or lime with farmyard manure did not markedly increase the uptake of nutrient elements compared with where lime was used alone.—P.J.B.

RICE

947 Ramiah, K. **Double cropping of rice in Cuttack, Orissa.** *Madras agric. J.* 1953, **40,** No. 1, 7-10. [Cent. Rice Res. Inst., Cuttack]

Rice on irrigated land in the Cuttack district is normally grown in the period June to December and is followed in the period January to April by a low-yielding crop, such as green gram (*Phaseolus radiatus*). Experiments were carried out in which a crop of short-duration rice replaced the pulse crop. The most suitable short-duration varieties of rice for sowing in January were found to be the Madras varieties Co. 13 and Ptb. 10 and the Chinese varieties CH. 45 and CH. 47 which gave yields varying from 1200 to 2000 lb. of paddy per ac. Trials carried out on village plots confirmed the results of the experiments. The economic advantages of growing a second rice crop in place of pulses in the period January-April are pointed out.—W.J.B.

948 Jones, J. W. **Rice production in the Southern States.** *Fmrs' Bull. 2043. U.S. Dep. Agric.* 1952, pp. 36, illus.

949 Agronomie Tropicale. Mission française de productivité pour l'étude de la production du riz aux U.S.A. Rapport préliminaire. [**A French mission of productivity to study rice production in the U.S.A. Preliminary report.**] *Agron. trop.* 1952, **7,** No. 3, 292-303.

950 Coleman, P. G. **Wet padi mechanisation investigations in Province Wellesley during the 1950-51 season.** *Malay. agric. J.* 1953, **36,** No. 1, 3-19, bibl. 1.

Attempts were made to mechanize the sowing and harvesting of swamp rice. Seed was broadcast on the surface of irrigation water (which was drained off after sowing) by the following methods : (a) by hand, (b) by fiddle, (c) by hand from a tractor, (d) by fiddle from a tractor. Although (d) was the fastest method, (b) gave the best results in regard to evenness of sowing and cost. Where a tractor was used seeds failed to germinate in the ruts made by the tractor. Harvesting with a trailer-type combine proved unsuccessful, except when the weather was favourable and where the control over drainage was sufficient to permit the proper drying of the land. It is pointed out that the mechanization of the various operations connected with the growing and harvesting of rice is unlikely to be successful unless better methods of drainage-control are first introduced.—W.J.B.

951 Calma, V. C. and Cuaresma, F. M. **A plot test of four selected strains of Seraup Kechil 36.** *Philipp. Agriculturalist* 1951, **35,** No. 6, 329-32. [Received 1953]

Of 155 selections of Seraup Kechil 36 lowland rice tested at Laguna, Philippines, strains 233 and 482 were considered worthy of adoption as commercial varieties.—P.J.B.

952 Grillot, G. and Loisil, L. La qualité du riz au Maroc. [**Rice quality in Morocco.**] *Terre maroc.* 1952, **26,** No. 274, 325-6. [Cent. Rech. Agron., Rabat]

The principal grain characters of the rice varieties harvested in Morocco in 1950 and 1951 are described and tabulated.—E.B.O.

953 Vianna e Silva, M. A influência da idade da semente na germinação do arroz. [**The influence of age of seed on the germination of rice.**] 1947, pp. 16, bibl. 10, Lisbon; Minist. Econ. Com. Reguladora Comérc. Arroz. [Received 1953]

Germination tests were carried out in 1946 on rice seed harvested during the previous 4 years from the following types of *Oryza sativa* ssp. *japonica* : Allorio, Chinês, Muga, Ardizzone and Nero Vialone. Germination was normal (95-99%) for all types harvested in 1945 and 1944, below normal for seeds harvested in 1943 and poor for seeds harvested in 1942. After the second year of storage the germination capacity of seeds of Muga and Nero Vialone declined more rapidly than it did in seeds of other varieties.—W.J.B.

954 Ceylon Department of Agriculture. **Departmental notes. Weed control in paddy.** *Trop. Agriculturist* 1952, **108,** No. 3, 196-9.

An account is given of the control, by means of suitable cultivations, of the following weeds of rice: *Echinochloa colona, E. frumentacea, E. crus-galli, E. stagnina, Coix gigantea, Ischaemum rugosum, Fimbristylis miliacea, Cyperus dehiscens, Aeschynomone indica* and Batadella [botanical name not given]. Seeds of *Echinochloa* sp. can be separated from rice grain by flotation in water.—W.J.B.

955 Barat, M. H. Lutte contre les mauvaises herbes dans les rizières américaines. [**Weed control in American rice-fields.**] *Bull. Madagascar* 1953, No. 72-3, 40-50, bibl. 14.

This is a review of methods adopted in the USA. —E.B.O.

956 Prettenhoffer, E. and others. Kísérletek a rizs barnulásos (bruzone) betegségének megelözésére. **Attempts to prevent blast of rice (brusone).** *Agrokém. és Talaj.* 1951, **1,** No. 2, 211-34, bibl. 5, Russian and English summaries pp. 231-4. [Received 1952] [Res. Inst. Irrig. Melior. Agric. Exp. Sta., Szeged, Hungary]

Browning disease of rice (commonly called brusone) is caused by a complex of factors. No conclusions can be drawn from these studies, made during 1949-50. The investigations are still in progress.—From authors' summary.

957 Fuggles-Couchman, N. R. **The destruction of rice-eating birds.** *E. Afr. agric. J.* 1952, **18,** No. 2, 77-8.

Since the pilot rice scheme was started at Kilangali in Tanganyika severe damage has been suffered by the crop from birds of the *Quelea* genus. A trial was begun in order to determine the best method of destroying the nesting population in an adjacent swamp by using gelignite and time fuses. The method is described. The results were promising. The main difficulty lay in discovering the relatively inaccessible nesting places, but, by careful watching, this could be overcome.—M.A.

958 Ramiah, K. and others. **Improvement of rice in India.** *Emp. J. exp. Agric.* 1952, **20,** No. 79, 161-74, bibl. 24. [Cent. Rice Res. Inst., Cuttack, India]

The main problems of rice improvement in India are concerned with the production and testing of high-yielding varieties, breeding for earliness, stiff straw, resistance to disease and insect pests, and, in certain localities, breeding for deep-water conditions, resistance to flood and salinity, etc. As a complement to breeding, improvement of cultural and manurial practices are very important.—K.L.

959 Piacco, R. La selezione del riso in tre tempi sul campo. [**Rice selection in three stages in the field.**] *G. Agric. Domen.* 1952, **62,** No. 49, 374. [Sta. Risicolt., Vercelli, Italy]

The process of rice selection in the field by discarding plants showing unwanted characters, mainly red grains, is briefly described. This selection must be carried out every year and is followed by the mechanical selection of the seed. Selection in the field is carried out in 3 stages, i.e., at flowering, in the wax stage and at maturation. In the first stage, plant height is the main character examined. In the last stage, mainly plants with red grains are eliminated. It is advisable to examine the plants in the field after a heavy shower when the red grains are more easily detectable through the moist husks. —E.B.O.

960 Kondo, Y. **Physiological studies on cool-weather resistance of rice varieties.** [Japanese] *Bull. nat. Inst. agric. Sci. Ser. D.* 1952, No. 3, 113-228, bibl. 203, illus., English summary pp. 224-8.

Experiments were carried out in 1938-46 to determine the nature of the injuries caused to rice plants by low temperatures, cool-water irrigation and late planting and to compare the resistance of different varieties to these injuries. Treatment at a temperature of 17°C. over a period of 13.5 days, applied at the time of the formation of reproductive cells, caused complete sterility of the spikelets. Cold treatment at temperatures between 10 and 17°C. applied during the vegetative and ripening stages were almost without effect. It was found that, for practical purposes, the resistance of rice varieties to cold can be measured by the number of sterile spikelets which result from the application to the plants of temperatures of 17°C. for 8-10 days at the time the reproductive cells are forming. The use of cool water during the irrigation period (from the time of striking root to early maturity) caused an increase in the number of sterile spikelets and a decrease of the 1000-grain weight of the fertile grains. There were marked varietal differences in resistance to cool-water irrigation corresponding with differences in resistance to low temperatures in the early reproductive stage. Late sowing of rice gave rise to abnormally high numbers of sterile spikelets, delayed heading and, in some cases, resulted in failure of the maturation process. The high incidence of sterility was least pronounced in the varieties most resistant to cold. Varietal differences in resistance to delayed heading and poor ripening caused by late sowing could not be correlated with varietal resistance to injury caused by low temperatures applied during the early reproductive stage.—From author's summary.

961 Velasco, J. R. and Novero, R. P. **Studies on foliar diagnosis: 1. Nitrogen relations.** *Philipp. Agriculturalist* 1951, **35,** No. 5, 223-32, bibl. 22, illus. [Received 1953]

Studies were made on 45-day-old Elon-Elon rice to determine, (a) which were the most suitable leaves to sample for the foliar diagnosis of N deficiency and, (b) the effect of elements, other than N, in the nutrient medium on the N content of young rice leaves. The results showed that in 45-day-old rice plants the most recently matured leaves were best suited for foliar diagnosis of N deficiency. With rice grown in nutrient solutions deficient in P, K, Ca, Mg and S, only P deficiency appeared to reduce the uptake of N by the plants.—P.J.B.

962 Govinda Rajan, S. V. and Venkata Rao, B. V. **Manures and fertilizers: their efficient and effective use for increased crop production.** *Mysore agric. J.* 1952, **28,** No. 4, 77-91.

Experiments to determine the optimum time of application of ammonium sulphate to rice were carried out in pot cultures and on various farms in Mysore. Applications of ammonium sulphate 4-6 weeks after transplanting, as compared with applications at the time of transplanting, increased the number of ears formed, the average weight of grain per ear and the total yield of grain. Graphs showing grain yields in the pot experiments plotted against the date of application of the ammonium sulphate show a peak of grain yield corresponding to an application of manure four weeks after transplanting in each of the 3 seasons 1946-7, 1947-8 and 1949-50. Significant increases in the yields of rice and ragi (*Eleusine coracana*) were obtained by applying P at the rate of 0.5 to 1 cwt. per ac. of bone meal to the preceding green-manure crops which were sunn hemp (*Crotalaria juncea*) before ragi and sunn hemp and horsegram (*Dolichos biflorus*) before rice. Applications of phosphate to a preceding green-crop were more beneficial to rice than direct applications of phosphate, whether as superphosphate or as bone-manure. The optimum depth at which phosphatic fertilizers should be placed for ragi crops was found to be 3 to 6 in. Practical methods used for placing the fertilizer for a ragi crop are described.—W.J.B.

B'S TEARS

3 VIEGAS, G. P. Aspectos da cultura do cereal "adlay." [**Aspects of the cultivation of the cereal "adlay" or Job's tears.**] *Bragantia* 1951, **11**, Nos. 1-3, 81-6, bibl. 11, illus., English summary p. 85. [Agron. Inst. Campinas, Brazil]

evious experiments in Brazil have demonstrated
e value of a short-stemmed, dark-grained type of
b's tears (*Coix lachryma-jobi*) as a source of grain
r poultry feeding. Further experiments were
rried out at 5 experimental stations in the State
São Paulo in the years 1948-51 to determine the
timum sowing date, sowing rate, inter-row spac-
g and manurial treatment for short-stemmed
b's tears. The yields were extremely variable
om year to year and from place to place. As a
sult of the experiments the following observations
ere made on the cultivation of Job's tears in the
ate of São Paulo: (1) sowing should take place in
ctober or November; (2) the sowing rate can
ry from 8-33 g. of seed per row of 10 m.; (3) the
ter-row space should be 60-120 cm.; (4) yields
e satisfactory only when crops are grown on
rtile, moist soils in unexposed areas receiving
lequate rainfall.—W.J.B.

ENERAL

4 WEIBULL, G. Sortspridning inom våra stråsädesslag. [**The extent of use of different varieties among our (Swedish) cereals.**] *Weibulls ill. Årsb.* 1953, **48**, 11-22.

atistical data, taken from official seed certifica-
on records in Sweden, are given of the relative
nounts of the seed of different cereal varieties
bmitted for certification during the 1951-2
ason. Among winter wheat varieties, Eroica I and
comprised 48.6% of the total amount of seed
bmitted, followed by Odin with 15.5% and
andia I and II with 11.8%. Among spring
heats, Kärn I and II comprised 64.1% of the
tal, followed by Pondus, 10.4% and Diamant II,
2%. Among rye varieties, 66.8% of the total was
ungs I and II, followed by Petkus II von Lochow
ith 24.3% and Stål with 7.3%. Among 2-row
rley varieties, Herta comprised 37.5% of the
tal, followed by Rika, Ymer and Bonus, with 15,
.1 and 8.8%, respectively. Among 6-row barley
rieties, Edda I and II comprised 60.4 and Stella,
ega and Asa 15.6, 5.0 and 8.5%, respectively.
mong white and yellow oat varieties Sol I and II,
ger, Guldregn II and Blenda comprised 34.0, 20.2,
.4 and 11.3% of the total, respectively, and
mong black oats, Stormogul II and Orion II and
I, 59.7 and 14.4%, respectively. Data are also
ven for the different winter and spring wheats
d winter rye varieties over the period 1930-
.—P.J.B.

965 BAEKGAARD, H. C. Undersøgelser over spiringen af korn i marken sammenlignet med spiringen i laboratoriet. [**Investigations into the germination of cereals in the field compared with that in the laboratory.**] *Tidsskr. Planteavl* 1952, **55**, 476-510, English summary pp. 509-10.

Studies were made to compare the germination of oats and barley in the field and in the laboratory. The results showed that the germination of the seed was between 12 and 15% lower in the field than in the laboratory. It is considered that as the germination percentage of the seed in the laboratory decreases, the sowing rate of such seed in the field should be increased by a greater amount than the percentages found in the laboratory would indicate. For example, in the case of two seed samples with a laboratory germination of 80 and 60%, the sowing rate should be increased by 30 and 90 kg. per ha., respectively, to obtain the same number of plants in the field as that given by sowing 100 kg. per ha. of seed with a germination of 100%.—P.J.B.

966 ELOMAA, A. Viljan peittauskokeiden tuloksia vuosilta 1928-1950. **Results of cereal seed treatment experiments with disinfectants during the years 1928-1950.** *Valt. Maatalousk. Tiedon.* 1952, No. 226, 3-43, English summary pp. 42-3.

The purpose of this work is to show to what extent chemicals for seed treatment increase grain yields in Finland. The paper deals chiefly with local experiments conducted in the fields of various growers in different parts of the country. The report also gives a survey of the results of seed treatment conducted at the Departments of Plant Pathology and Plant Husbandry of the Agricultural Research Centre, local experimental stations, permanent experiments fields, experimental stations of the Peat Culture Society of Finland, and at Hankkija's Plant Breeding Station at Tammisto.—From author's summary.

967 ŠUROVENKOV, B. G. and VOLKOV, S. T. [**Thermo-electric apparatus for disinfecting the seeds of grain crops against loose smut (*Ustilago* spp.).**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* (*Proc. Lenin Acad. agric. Sci.*) 1952, **17**, No. 10, 17-21, illus. [N. Filial Sta. Pl. Prot., Kazahstan]

The equipment described and illustrated facilitates grain treatment at the locality in which the grain is harvested and at any time of the year. The apparatus is so constructed that temperature of the water can be regulated, an important aspect in treating grain which is to be used for sowing.—M.H.

968† KURIR, A. Frasspflanzen des Wiesenspinners (*Hypogymna morio* L.). [**Plants eaten by**

Hypogymna morio **L.**] *Bodenkultur* 1951, **5,** No. 4, 492-506, bibl. 36, illus. [Hochsch. Bodenkult., Vienna]

Winter and summer cereals are tabulated according to the degree to which they are devoured by *Hypogymna morio*. This information, together with a short study of the insect's life history, furnishes a basis for avoiding severe damage by the pest.—G.M.R.

969 Oswald, J. W. and Houston, B. R. **The yellow-dwarf virus disease of cereal crops.** *Phytopathology* 1953, **43,** No. 3, 128-36, bibl. 25, illus. [Pl. Path. Dep., Univ. California, Davis]

Yellow-dwarf virus disease of cereals reached epidemic proportions in California in 1951. Its vectors and symptoms in wheat, oats and barley are described and studies reported on its effect on yields, following infection of cereal plants at different growth stages. The virus could not be transmitted mechanically, nor through seed or soil; all of 5 grain-weevil species studied were vectors of the disease. 4 barley varieties were highly resistant to the disease. They were C.I.1227, C.I.1237, C.I.2376 and Abate ; Rojo and Hannchen were tolerant. No oat varieties were as resistant as the first 4 barley varieties mentioned, but Kanota and Bond were tolerant. In limited trials with wheat, Sonora 37 appeared to be the most tolerant, among Californian varieties. With all 3 cereal crops the earlier the time of infection, the greater the yield losses. In 3 barley varieties naturally infected when in the seedling stage in the field, yields were reduced by 95%, compared with controls.—P.J.B.

970 Longchamp, R. and others. Nouvelles recherches sur l'action de quelques hétéro-auxines désherbantes sur les céréales. [**Recent research on the action of some hetero-auxin weedkillers on cereals.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. B. Ann. Amélior. Pl.* 1952, **2,** No. 1, 117-54, bibl. 11. [Sta. Physiol. Vég., Versailles]

At 20 experiment stations in France a study was made of the effect of derivatives of 2,4-D and MCPA on 106 varieties of wheat, oats and barley. For each variety, 1-10 experiments were made, each embracing 24-45 treatments. The products tested were sodium salts of 2,4-D and MCPA, and the ethyl ester of 2,4-D. They were applied either as liquids or as solids, and the plants were treated sometimes before they emerged and sometimes after they had come up; in the latter case at different stages of development. The varietal behaviour under the various treatments is described and a classification of the varieties into 7 categories, in accordance with their degree of sensitivity to the weedkillers, is presented. Future articles will deal with the technique of the trials, their yield results, and general conclusions. The following are some of the authors' findings. In most cases the ethyl ester of 2,4-D proved more toxic to cereals than the sodium salts of 2,4-D ; it was also more variable in its toxic effects. On the other hand, the sodium salts of MCPA and 2,4-D had comparable effects. Sodium salts of 2,4-D proved less toxic when applied as a solid than when applied as a liquid, and the addition of sodium nitrate to solid 2,4-D produced a remarkable diminution in its toxicity. The results of treatment before the plants came up varied greatly according to locality, and with this treatment the ethyl ester of 2,4-D always proved a little less toxic than the sodium salts of 2,4-D. In general, the toxicity of MCPA used at this stage was so much the less the greater the lime content of the soil. In one case MCPA caused a stimulation of oats when applied before the plants came up. The response of the winter wheats to the different treatments varied according to their stage of development at the time of treatment. The spring-sown cereals appear to be more sensitive than the winter cereals, although there are some spring barleys and oats which are equally or even more resistant than some winter wheats.—G.M.R.

971 Longchamp, R. and others. Action de quelques hétéro-auxines sur la morphogénèse des céréales. [**Action of certain heteroauxins on cereal morphogenesis.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. B. Ann. Amélior. Pl.* 1952, **2,** No. 2, 305-27, bibl. 11, illus. [Versailles and Paris]

Investigations were made into the reaction of some 107 varieties of wheat, oats, and barley to the ethyl ester of 2,4-D, the sodium salt of MCPA and to the sodium salt of 2,4-D. Applications were made of 0.5, 1, 2, 5 and 10 kg./ha. in solution and 4 or 10 kg./ha. in solid form. It was shown that heteroauxins affected the plants systematically and that at first the plants passed through a series of stages where marked reaction to the heteroauxins was followed by a relatively inert stage.—M.A.

972 Andersen, S. Metoder til bestemmelse af udviklingstrin i korn. [**Methods of determining the growth stage in cereals.**] *Ugeskr. Landm.* 1952, **97,** No. 36, 543-6, bibl. 3.

The respective merits of measurements of plant height, leaf numbers and the use of Feekes' developmental stages for determining the growth stages of cereals are discussed, with particular reference to the second method. In determining leaf numbers, 4 methods are reviewed : (a) counting the number of leaves on the main shoots and determining leaf numbers by dividing the total leaf number by the number of plants ; (b) counting the number of tillers, plus the number of leaves on the main shoots above the level of the insertion of the tiller, the leaf number being found by dividing the mber of tillers plus leaves on the main shoots by e number of plants ; (c) the number of leaves on e main shoots plus the number of tillers is unted—the leaf number is found by dividing this tal by the number of plants ; (d) the number of ves on both main shoots and tillers is counted d divided by the number of main shoots and lers. Method (a) has been commonly used in nmark in trials with herbicides and can be pidly carried out where the main shoots have less an 5 or 6 leaves ; for older plants, method (b) is ther more easily carried out. The most exact thod for determining growth stage is considered be the examination of the morphological velopment of the cereal shoot, combined with e use of Feekes' method, or leaf counts.—P.J.B.

3 POWER FARMER. **How wet is it** [**grain**] ? *Pwr Fmr* 1953, **10,** No. 5, 166-8, illus.

brief review is given of the different techniques ed to determine the moisture content of grain. nong the different types of instruments noted are ose using the dielectric and d.c. resistance prin- ples.—P.J.B.

LEGUMES

YABEAN

4 HARTWIG, E. E. and JOHNSON, H. W. **Effect of the bacterial pustule disease on yield and chemical composition of soyabeans.** *Agron. J.* 1953, **45,** No. 1, 22-3, bibl. 4. [Delta Branch Agric. Exp. Sta., Stoneville, Mississippi]

ta are given on the yield, seed weight, protein d oil content and iodine number of the oil of yabean selections of a cross Ogden × CNS, cluding selections both resistant and susceptible bacterial pustule of soyabeans (*Xanthomonas aseoli* var. *sojensis*). The selections were grown at locations, at Willard in N. Carolina and at oneville in Mississippi. The resistant selections oduced 11% more seed than the susceptible selec- ons at Stoneville and 8% more at Willard. The ed size of susceptible selections was 3% less than e resistant selections at Stoneville and 4% less at illard ; the yield differences were considered to due to differences in seed size and to the number seeds produced per acre. The protein content of e seed of the resistant selections was slightly gher than that of the susceptible selections, but ferences in oil content were slight. The iodine mber of the oil was significantly higher in the sceptible than in the resistant selections.—P.J.B.

5 HAUSER, E. W. and YOUNG, D. W. **Penetration and translocation of 2,4-D compounds.** *Proc. Joint 9th N. Cent. and 6th W. Canad. Weed Contr. Conf. 1952* 1952, 27-31. [Iowa Agric. Exp. Sta., Ames]

Studies were made of the rates of penetration and translocation in soyabean plants of the Na and dimethylamine salts, the isopropyl ester, and a low volatility ester, of 2,4-D, applied as sprays with the following different wetting agents: Triton B-1956 (non-ionic), C-61 (cationic), Hyamine 2389 (cationic), Tergitol 7 (anionic) and Triton X-100 (non-ionic). Na 2,4-D (100 ppm.) did not penetrate the soyabean leaves during a 60-min. exposure, but, where wetting agents were added, penetration occurred within 30 min. ; with 1000 ppm. concentrations of Na 2,4-D, respective figures were 15 and 4 min. Rates of penetration of the amine salt were rather more rapid than those of the Na salt. The isopropyl ester of 2,4-D was absorbed rapidly. In all cases, the addition of wetting agents increased the rate of penetration of the herbicides, the higher the concentration of 2,4-D per unit volume of spray, the more rapid the penetration.The existence of a carbohydrate reserve in the plants was not necessary for penetration, but was necessary for the translocation of 2,4-D. Amine and ester formulations appeared to be translocated with equal rapidity in the plants. Translocation rates were not significantly altered by moisture stress within the plants. The addition of toxic wetting agents, such as Triton X-100, reduced the rate of 2,4-D translocation within the plant by causing injury to the plant tissues.—P.J.B.

976 FREIBERG, S. R. and CLARK, H. E. **Effects of 2,4-dichlorophenoxyacetic acid upon the nitrogen metabolism and water relations of soyabean plants grown at different nitrogen levels.** *Bot. Gaz.* 1952, **113,** No. 3, 322-33, bibl. 30, illus.

High- and low-nitrogen soyabean plants grown in nutrient solutions were treated by introducing sodium 2,4-D into the nutrient solutions at a concentration of 4 ppm. of the acid equivalent. Neither high-N nor low-N plants showed any appreciable change in total dry weight after exposure to 2,4-D compared with untreated control plants which continued to accumulate dry matter. Treatment with 2,4-D apparently changed the absorbing capacity of roots as indicated by failure of treated plants to increase their content of total N, including nitrates, after exposure to 2,4-D. Plants treated with 2,4-D showed a decrease in the percentage of protein nitrogen in the leaves and an increase in the concentration of this fraction in stems and roots as compared with untreated controls. The results suggest that 2,4-D may affect proteolytic enzymes differently in leaves compared with stems or roots.—From authors' summary.

977 ZELITCH, I. and others. **The amino acid composition and distribution of N^{15} in soybean root nodules supplied N^{15}-enriched N_2.** *Pl.*

Physiol. 1952, **27,** No. 1, 1-8, bibl. 18, illus. [Univ. Wisconsin, Madison 6]

The amino acid composition of soyabean root nodules was determined by analysis of amino acid fractions separated by partition chromatography on starch columns. The results furnish further evidence that ammonia is the key intermediate in symbiotic nitrogen fixation.—From authors' summary.

GROUNDNUT

978 Tourte, R. and Pelissier, J. Recherches pluriannuelles de l'écartement optimum de l'arachide au Sénégal (1949-1950-1951). [**Several years' investigations on the best spacing for groundnuts in Senegal (1949-51).**] *Bull. agron. Minist. Fr. d'out. mer* 1952, No. 7, 126-35, illus. [Cent. Rech. Agron., Bambey, Senegal]

It is considered that there is no advantage in sowing more than 80,000 groundnut seeds per ha. and that this figure can be reduced if appropriate methods are employed. It seems that in mechanized cultivation the best results are obtained by growing groundnuts along twin rows. In these trials the distance between twin rows was 20 cm.—E.B.O.

979 Bouffil, F. and Tourte, R. L'écimage de l'arachide : pratique à condamner. [**Groundnut topping : a practice to be condemned.**] *Bull. agron. Minist. Fr. d'out. mer* 1952, No. 7, 136-43, bibl. 1, illus. [Cent. Rech. Agron., Bambey, Senegal]

It was confirmed that the total, or partial, topping of the non-fruit-bearing parts of the groundnut plant causes a decrease in yield of nuts and straw. [See also *Fld Crop Abstr.* 3 : 919.]—E.B.O.

980 Jaubert, P. Poursuite des études sur l'emploi de poudres fongicides pour le traitement des semences d'arachides. [**Further studies on the use of fungicidal dusts for treating groundnut seeds.**] *Bull. agron. Minist. Fr. d'out. mer* 1952, No. 7, 167-76, bibl. 4, illus. [Cent. Rech. Agron., Bambey, Senegal]

[See also *Fld Crop Abstr.* 4 : 1049; 5 : 462 and 463.]

981 Ritcher, P. O. and others. **Control of rootworms affecting peanuts.** *J. econ. Ent.* 1952, **45,** No. 6, 965-9, bibl. 8, illus. [N. Carolina Agric. Exp. Sta., Raleigh]

An account is given of field trials in controlling the rootworm, *Diabrotica undecimpunctata howardi*, on groundnuts, with several insecticides.—E.B.O.

982 Appert, J. Essais sur les possibilités des insecticides systémiques pour la protection de l'arachide contre la rosette. [**Trials to test systemic insecticides for controlling rosette disease of groundnuts.**] *Bull. agron. Minist. Fr. d'out. mer* 1952, No. 7, 195-203, bibl. 12, illus. [Cent. Rech. Agron., Bambey, Senegal]

983 Jaubert, P. Première étude au Sénégal des bactéries symbiotiques de l'arachide. [**First study on the symbiotic bacteria of groundnuts in Senegal.**] *Bull. agron. Minist. Fr. d'out. mer* 1952, No. 7, 144-61, bibl. 6, illus. [Cent. Rech. Agron., Bambey, Senegal]

An account is given of laboratory and field trials, carried out in 1951, in which the groundnut varieties 28-206, 24-11 and 24-5 were inoculated with 3 different strains of *Bacterium radicicola.* Significant increases in groundnut yield were obtained in some cases.—E.B.O.

984 Bouyer, S. and Collot, L. Oligoéléments et arachide. [**Minor elements and groundnuts.**] *Bull. agron. Minist. Fr. d'out. mer* 1952, No. 7, 77-88, bibl. in text, illus. [Cent. Rech. Agron., Bambey, Senegal]

Plot trials were carried out at Bambey and Louga in 1950, and at Bambey in 1951, to study the effect of applying magnesium, manganese, molybdenum, zinc, boron, fluorine and copper to groundnuts. The results indicated that the minor elements tested had no effect on groundnut yield, with the exception of a general harmful effect shown by molybdenum and, in some cases, by boron and fluorine. On the other hand, the application of molybdenum increased the weight of the root nodules.—E.B.O.

985 Prevot, P. and others. Carence azotée et phosphorée de l'arachide dans la région de Louga (Sénégal). Expérimentation 1952 [**Nitrogen and phosphorus deficiency of groundnuts in Louga region (Senegal). Trials in 1952.**] *Oléagineux* 1953, **8,** No. 3, 135-8, bibl. 5, illus. [Inst. Rech. Huiles et Oléagineux, IRHO]

It was confirmed that P applied to groundnuts is effective only when the N requirement of this crop is satisfied. It is thought that groundnuts should be manured with 15-20 kg. of N and 10-15 kg. of P_2O_5 per ha. The availability of K in the soil is generally adequate. [See also *Fld Crop Abstr.* 5 : 1157.]—E.B.O.

986 Bouyer, S. and others. Diagnostic foliaire de l'arachide. Résultats expérimentaux. [**The foliar diagnosis of groundnuts. Experimental results.**] *Bull. agron. Minist. Fr. d'out. mer* 1952, No. 7, 7-36, bibl. in text, illus. [Cent. Rech. Agron., Bambey, Senegal]

A detailed account is given of a 4 years' study of the method for determining manuring formulas for groundnuts by foliar diagnosis. As several difficuls were experienced, among which was the gth of time required for carrying out the emical analyses of the leaves, there is some ubt concerning the value of this method. The two ves chosen for analysis are : the first which ows from the branches arising from the cotylenary buds at the stages of pre-flowering and wering, and the leaf of the 5th order from these ne branches at the stage of fructification. The ter sampling, however, is considered less imrtant than the former. It is necessary to take into count the variations in composition of the leaves e to soil heterogeneity. [See also *Fld Crop Abstr.* 601.]—E.B.O.

7 Tourte, R. and Pelissier, J. Étude de l'influence des équilibres N.P.K. sur les rendements de l'arachide au Sénégal. [**A study on the influence of NPK balances on groundnut yield in Senegal.**] *Bull. agron. Minist. Fr. d'out. mer* 1952, No. 7, 37-44, bibl. in text, illus. [Cent. Rech. Agron., Bambey, Senegal]

8 Sauger, L. Réaction de différentes lignées d'arachide à une application d'engrais à doses croissantes. [**Response of different groundnut varieties to the application of increasing doses of fertilizer.**] *Bull. agron. Minist. Fr. d'out. mer* 1952, No. 7, 64-76, bibl. 6, illus. [Cent. Rech. Agron., Bambey, Senegal]

trial carried out to study the response of the oundnut varieties 24-11, 28-206, 28-207 and -94 to NPK fertilizer (10-15-8) applied at the es of 100, 200, 300 and 400 kg./ha., showed that rate of 100 kg./ha. gave an increase in nut yield approx. 25%, compared with the unmanured ntrol. This increase was almost as high as that tained from the highest rate of fertilizer.—E.B.O.

9 Bouffil, F. and others. Modes d'application et diffusion de l'engrais dans le sol. Étude sur l'arachide au Sénégal. [**The application and diffusion of fertilizer in the soil. A study on groundnuts in Senegal.**] *Bull. agron. Minist. Fr. d'out. mer* 1952, No. 7, 89-97, illus. [Cent. Rech. Agron., Bambey, Senegal]

A

) Rüther, H. Grundlagen des Leguminosen-Anbaues in Mitteldeutschland (insbesondere des Erbsen-Anbaues auf besseren Böden). [**Cultivation of legumes in central Germany (especially peas on the better soils).**] *Z. Acker- u. Pflbau* 1953, **96**, No. 1, 45-74, bibl. 17, illus.

991 Gelin, O. Weibulls Strålärt. En röntgenmutation ur Klosterärt. [**Weibulls Strål pea. An X-ray mutation from Kloster.**] *Weibulls ill. Årsb.* 1953, **48**, 28-30, illus.

A note is given on the X-ray treatment of pea seed and on a new strain, Strål, derived in 1942 from Kloster by this method. Strål is a very vigorous strain and has given average yields 10% higher than those of other commercial varieties tested in 144 official trials over an 8-year period. In trials at Weibullsholm, Strål has yielded an average of 244 kg. per ha., or 6% more than Kloster. Strål is very similar in time of maturity to Kloster and, in trials, had a 1000-grain weight of 165 g., compared with 173 g. for Kloster and 181g. for Torsdags II. —P.J.B.

992 Miller, M. W. **Preliminary investigations with dinitro and MCP sprays for weed control in legume seeded peas.** *Proc. 7th N.E. Weed Contr. Conf., 1953* 1953, 127-34, bibl. 7.

Plots sown with a mixture of peas, lucerne, red clover (*Trifolium pratensis*) and Chinese mustard (*Brassica juncea*) were treated when the peas were about 6 in. high with the following herbicidal applications per acre : Dow Selective (13.7% ammonium dinitro-sec-butyl phenate) at 3 qt. of active material in 50, 25 and 12 gal. water and 1.5 qt. Dow Selective in 12 gal. water, Premerge (alkanolamine salts of dinitro-o-sec-butyl phenol) at 1 qt. in 50, 25 and 12 gal. water and 0.5 qt. Premerge in 12 gal. water, 0.5 lb. MCPA acid equivalent in 50 and 12 gal. water and 0.25 lb. MCPA in 50 and 12 gal. water. Other weeds present, besides the sown mustard, were ragweed (*Ambrosia artemisiifolia*) and lamb's-quarters (*Chenopodium alba*). With Dow Selective, the low-volume sprays caused reductions in pea yields and legume stands. Injury following treatment with 3 qt. per ac. of Dow Selective in 12 gal. water was still obvious at harvest. Best results in terms of weed control and pea yields followed treatment with 3 gal. per ac. of Dow Selective in 50 gal. water. Weed control with Dow Selective varied from 76-92%. Lucerne was more tolerant than red clover to this herbicide. With Premerge, 90 - 100% weed control was secured. Spray volume had no apparent effect on the effectiveness of Premerge, or on the amount of injury caused to the peas. The greatest pea yield increases over untreated controls occurred where the highest herbicidal concentration was used with the lowest spray volume. Clover and lucerne were not appreciably affected by the Premerge treatments. MCPA gave 100% weed control in all cases, but caused considerable injury to the peas. Lucerne was less tolerant to MCPA than red clover. It was considered that MCPA may be of value when used at lower rates than those used in these trials.—P.J.B.

993 ANDERSEN, A. L. and de ZEEUW, D. J. **Pea seed treatment investigations. (Report of progress.)** *Quart. Bull. Mich. State Coll.* 1952, **35,** No. 1, 25-33, bibl. 7.

The results are given of 3-years' trials with different fungicides for the control of seed rot and damping-off in peas. In trials during 1949-50, Phygon (2,3-dichloro-1,4-naphthoquinone) gave considerably better results in terms of pea seedling stands, than any other seed treatment, the difference being significant in 1949. In trials during 1949-51 to compare the effectiveness of the same fungicides applied either as slurries, or as dusts, the results indicated that both methods were equally effective. In trials during 1951 only, Agrox (6.7% phenyl mercury urea), followed by Phygon XL, Semesan (30% hydroxymercuric chlorophenyl) and Puratized C-12-2525 (organic mercury cadmium compound), were very effective as seed treatments.—P.J.B.

994 TREMBLAY, F. T. and BAUR, K. E. **Plant analysis—a method of determining the phosphorus requirements of peas.** *Agron. J.* 1952, **44,** No. 12, 614-18, bibl. 4. [Wash. Agric. Exp. Sta., Pullman]

Studies were made of the P uptake and P content at different growth stages and in different parts of the plant and the seed yields of peas grown on 3 soil types in Washington and receiving different P treatments. The results showed that the best growth stage at which determinations of the P status of plants could be made was between the 4- and 8-node growth stages ; either all the above-ground parts of the plants, or the leaves at the third node from the top, were suitable for such determinations. It was estimated that where the above-ground parts of the plants, or the leaves at the third node from the top contained under 1200 ppm. P, the plants were deficient in P ; contents of 1200 to 2000 ppm. P were regarded as indicative of low P status, while levels above 2000 ppm. P were considered to indicate adequate P status and that no response by the plants to P applications could be expected. There was a significant correlation between the P content of the parts of the plants described above and the yield of shelled peas.—P.J.B.

995 COOKE, G. W. and DADD, C. V. **Fertilizer placement experiments on threshed peas.** *Agriculture, Lond.* 1953, **60,** No. 1, 34-8. [Rothamsted Exp. Sta., Harpenden, Herts.]

The results are given of trials over a 6-year period at Rothamsted and other locations in eastern England, which showed that on soils with a low P and K content, band placement of 2.5 cwt. per ac. of P K manure to the side of, and slightly below, the seed-rows gave yields averaging 2 cwt. per ac. higher than similar broadcast treatments. On fertile silt soils, pea yields in 2 experiments in 1950 were unaffected by manurial treatment, whether applied in bands, or broadcast.—P.J.B.

BEAN

996 BRACCI, Leda. Ottenimento di tubercoli radicali in radici di fagiolo coltivate *in vitro* e loro inibizione mediante acido ascorbico. [**Root nodules obtained from roots of bean (*Phaseolus vulgaris*) grown *in vitro* and their inhibition by means of ascorbic acid.**] *Nuovo G. bot. ital.* 1951, **58,** No. 3-4, 491-3, bibl. 5, English summary p. 493. [Publ. 1952]

997 HEMBERG, T. **The effect of vitamin K and vitamin H' on the root formation in cuttings of *Phaseolus vulgaris* L.** *Physiol. Plant.* 1953, **6,** No. 1, 17-20. [Bot. Dep., Roy. Pharm. Inst., Stockholm]

In trials with cuttings of *Ph. vulgaris* grown in sand cultures, it was evident that both vitamin K and vitamin H', in conjunction with indole acetic acid in the nutrient solution, caused considerable increases in root formation, compared with that where indole acetic acid, alone, was present. Vitamin K by itself did not stimulate root formation. Vitamin H' in some cases appeared to promote rooting. It is considered that plants which can only with difficulty be induced to root by hormone treatment, may contain very low amounts of these vitamins. It has also been shown by Hey and Hopf (1951) that plants which are only to a slight extent affected by hormone herbicides have very low vitamin K contents, in contrast to those readily affected by such materials. [See also Abs. 4 : 1200.] —P.J.B.

998 TRUDOVA, R. G. [**The influence of Röntgen ray irradiation on the process of root formation in cuttings of *Phaseolus* sp.**] [Russian] *Doklady Akad. Nauk SSSR (Proc. Acad. Sci. USSR)* 1952, **85,** No. 2, 429-32, bibl. 7. [Timirjazev Inst. Pl. Physiol. Akad. Sci. USSR]

999† SCURTI, Jole. Sul meccanismo d'azione dei diserbanti selettivi. Le modificazioni istologiche e citologiche che l'Agroxone produce sulle erbe infestanti. [**On the mechanism of action of selective herbicides. The histological and cytological changes caused by Agroxone in weeds.**] *Ann. Sper. agr.* 1952, **6,** No. 6, 1683-704, bibl. 36, illus., English summary pp. 1701-2. [Sta. Chim.-Agr. Sper., Torino, Italy]

A study was made of the histological and cytological changes, induced in the stems and leaves

Capsella bursa-pastoris and *Vicia sativa* by atment with Agroxone, which caused the death the plants.—E.B.O.

HER

00 Gavrielit-Gelmond, C. **Experiments on dormancy of *Lathyrus ochrus*.** *Proc. internat. Seed. Test. Ass. 1951/52* 1952, **17,** No. 2, 139-42. [Hebrew Univ., Jerusalem, Israel]
rmancy in *L. ochrus* in Israel may last up to 225 ys, the percentage of seeds germinating at harst time varying from nil to 90%. There was a relation between seed size and dormancy—the ger the seed, the shorter the period of dormancy. nuring, irrigation and very late threshing peared to reduce seed dormancy, as did growing plants on heavy soils. Germination percentages the seed varied in inverse proportion to (1) the mber of days the Khamsin (a hot, dry, seasonal, t wind) blew during seed maturation, and (2) temperature during seed ripening. Impermelity of the seed coat, and physiological dormancy, sed by a factor responding to oxygen supply, e responsible for seed dormancy. Physiological mancy usually disappeared within 60 days from vest, while seed dormancy persisted up to 225 s, though in some cases, this order was reversed. rmancy could be broken within 60 days from vest by seed scarification with H_2SO_4, or by asion, and then treating the seed with oxyated water, or in atmospheres containing a h O_2 concentration.—P.J.B.

ROOTS

GAR-BEET

1 Nuckols, S. B. **Sugar beet culture in the northern Great Plains area.** *Fmrs' Bull. 2029. U.S. Dep. Agric.* 1951, pp. 53, illus. [Received 1953]
recommendations given for growing sugart apply to irrigated areas of Nebraska, Wyomand South Dakota.—P.J.B.

2 Brykczyňski, J. Zagadnienie rejonizacji odmian buraka cukrowego. [**Regionalization of sugar-beet varieties (in Poland).**] *Rocz. Nauk Rolnicz.* (*Polish agric. Ann.*) 1952, **60,** 95-118, bibl. 29, Russian and English summaries pp. 115-18.
varieties of sugar-beet are suitable for growing e beet areas of Poland, but richer soils should sed for the more highly productive types. The hern areas of the country are unsuitable for eties which are inclined to bolt.—M.H.

1003 Malygin, V. [**Trials for the production of high yields of sugar-beet in the Kuban.**] [Russian] *Sahar. Promys.* (*Sug. Industr., Moscow*) 1952, **26,** No. 11, 33-7.
An account is given of the cultural measures practised on a beet State-farm in the Krasnodar Territory. The good yields of sugar-beet obtained are attributed partly to the use of mechanical cultivation.—M.H.

1004 Rapin, J. Résultats d'essais comparatifs de betteraves à sucre. [**Results of sugar-beet variety trials.**] *Rev. rom. Agric.* 1953, **9,** No. 4, 29-30. [Sta. Féd. Essais Agric., Lausanne]
Results from the Swiss federal stations at Oerlikon, Liebefeld and Lausanne over the period 1949-52 are summarized. In the 1949-51 trials, Klein Wanzleben E showed marked superiority over other varieties both in yield of roots and in sugar content. In the 1950-52 trials Klein Wanzleben E and Zwaanesee 111 gave higher yields of roots over other varieties and both these varieties, together with Hilleshoeg Svea K, showed the highest sugar contents.—M.A.

1005 Heinisch, O. Zuckerrübensaatgutbau durch Spätsommeraussaat. [**Late summer sowing for sugar-beet seed production.**] *Dtsch. Landw.* 1952, **8,** 2, bibl. 3, illus. [Leipzig]
The sowing of sugar-beet in the late summer is recommended for the production of seed in the following spring. Virus attack was less severe when seed was sown early in August ; late sowing increased the difficulty of obtaining a good tilth. Close planting of 40 cm. between rows at a seed rate of 12 kg./ha. was the most practical.—M.A.

1006 Paatela, J. and others. Mahdollisuuksista tuottaa sokerijuurikkaan siementa kasvupaikallaan talvehtineista juurikkaista suomessa. **On the possibility of producing sugar-beet seed in Finland from beets overwintering in the field.** *Maataloust. Aikakausk.* 1953, **25,** No. 1, 23-34, bibl. 3, illus., English summary p. 34.
This paper contains the chief results of the overwintering experiments with sugar-beet which were established through the Finnish Raw Sugar Factory, Ltd. at Salo in 1950, and at Salo and Jokioinen in 1951. Judging by the preliminary experiences of 1950-1 and 1951-2, it is concluded that where overwintering conditions are favourable in south-west Finland there is a possibility of producing sugar-beet seed from beets overwintering in the field.—From authors' summary.

1007 Stockebrand, A. Einwirkung von Ultraschall auf Keimung und Wachstum der Zuckerrübe. [**Effect of ultrasonic sound**

waves on the germination and growth of sugar-beet.] *Z. Acker- u. Pflbau* 1952, **95,** No. 4, 401-22, bibl. 13, illus. [Inst. Pflbau, Göttingen]

Unsoaked sugar-beet seed was subjected to intensive treatment of sound waves (175 kHz at 5 w./sq. cm.) for 60 min. without affecting germination. Only after 90 minutes sound treatment and longer was the germination adversely affected. Using presoaked seed, germination was reduced within 48 hr. of treatment. Mono-germ seed was affected more than multi-germ seed. Under intensive treatment diastase became inactive in the seed. Long and intensive sound treatment of the seed reduced the yield from plants grown from such seed.—M.A.

1008 NELSON, R. T. **Control of wild oats and volunteer grain in sugar beets with IPC.** *Proc. Joint 9th N. Cent. and 6th W. Canad. Weed Contr. Conf., 1952* 1952, 73-5.

Trials in Colorado were carried out to compare emulsifiable ClIPC and IPC, each applied at rates of 3 and 6 lb. per ac. for the control of wild oats (*Avena fatua*) and other volunteer cereals in sugar-beet. The herbicides were applied in 10 gal. water as pre-emergence treatments. In 8 out of 15 trials, excellent control of wild oats was secured with all treatments. Thorough incorporation of the herbicides with the top layer of soil was essential to prevent their rapid volatilization. IPC caused less damage to the sugar-beet than did ClIPC, particularly in the case of the 6 lb. per ac. treatments. Where conditions were favourable to the germination of volunteer cereals and wild oats, good control was obtained with the 3 lb. per ac. rate of IPC. Where sugar-beet was sown before most of the IPC had disappeared from the soil, a considerable delay in sugar-beet emergence was noted, following applications of 6 lb. per ac.—P.J.B.

1009 ANDERSEN, E. T. **Chemical weed control studies with sugar beet.** *Proc. Joint 9th N. Cent. and 6th W. Canad. Weed Contr. Conf., 1952* 1952, 77. [Univ. Manitoba]

A report is given on studies in Manitoba on the use of different herbicides for controlling green foxtail (*Setaria viridis*) and wild oats (*Avena fatua*) in sugar-beet crops. Pre- and post-emergence treatments with 10 or 15 lb. per ac. of TCA Na salt controlled foxtail. Rates of 5 lb. per ac. of TCA Na salt gave fair control of foxtail, following post-emergence treatments, only. IPC and ClIPC applied at rates of 4 and 8 lb. per ac. as post-emergence treatments and 4, 8 and 16 lb. per ac. as pre-emergence treatments effectively controlled wild oats, but not foxtail. Pre-emergence applications of 8 lb. per ac. of Endothal (16% endoxohexahydrophthalate) controlled foxtail, but not wild oats. The sugar-beet was not noticeably affected by the Endothal treatment. Endothal at 4 lb. per ac. + IPC at 4 and 8 lb. per ac. [type of application no stated] gave good control of both weed species without injuring the sugar-beet. The effectivenes of IPC and ClIPC appeared to be greatly enhance by moist soil conditions; in dry conditions, thes materials were relatively inert.—P.J.B.

1010 GHILLINI, C. A. Marciume radicale dell bietola zuccherina provocato da *Sclerotiun rolfsi*.] [**Root rot of sugar-beet caused b** ***Sclerotium rolfsi*****.**] *Industr. saccar. ital.* 1952 **45,** No. 5-6, 199-206, bibl. 12, illus. [Ist. Pat Veg., Univ. Padova, Italy]

Root rot, caused by *Sclerotium rolfsi*, damage sugar-beet crops grown in peaty soils in the P Valley. *S. rolfsi* was also found on hemp (*Cannabi sativa*) for the first time. The conditions whic favour the development of this fungus are: presence of organic matter in acid soils, high temperature and low moisture content of the soil. Contro measures are suggested.—E.B.O.

1011 MELIS, A. and MARINARI, Anna. Nuovo contributo alla ricerca dei mezzi di lotta contro cleono delle bietole (*Temnorrhinus mendicu* Gyll.). [**A new contribution to the research on methods for controlling *Temnorrhinus mendicus* on sugar-beet.**] *Industr. saccar. ital* 1952, **45,** No. 11-12, 410-22, bibl. 1, illus.

Chlordane, the pure γ-isomer of BHC, and technica BHC, applied at high rates, were effective. [See als *Fld Crop Abstr.* 5 : 1177.]—E.B.O.

1012 VICINI, L. and GIRALDI, G. L'infestazione d nottua che ha colpito il Basso Polesine [**The infestation by *Laphygma exigua* in the Low Polesine (Italy).**] *G. Agric. Domen.* 1952 **62,** No. 37, 278.

Infestations by *Laphygma exigua* developed in 195 on crops of sugar-beet, summer maize, sunflower etc. Control measures are suggested.—E.B.O.

1013 van DUUREN, A. J. Biochemisch onderzoek van suikerbieten. 1. Het belang van papierchromatografische analysemethoden voo suikerbieten onderzoek. [**Biochemical research on sugar-beet. 1. The importance of paper-chromatographic methods of analysis in research on sugar-beet.**] *Meded. Inst. ra Suikerprod.* 1952, **22,** No. 4, 251-62, bibl. 10 English and French summaries pp. 260-1

A survey is given of the literature on paper chromatographic methods of analysis in relation t research on sugar-beet. The following substance are among those which can be determined by thes methods: amino-acids, amines, purines, sugar and organic acids.—From author's summary.

1014 BLOUCH, R. and others. **Free amino acids i sugar-beet leaves altered by zinc dimethyl**

dithiocarbamate. *Bot. Gaz.* 1952, **114,** No. 2, 248-51, bibl. 5. [Colorado Agric. Exp. Sta.]

e effect of foliage-spray applications of the
gicide Zerlate (zinc dimethyldithiocarbamate)
the free amino acids in sugar-beet leaves grown
greenhouse was measured in a series of analyses
olving total ninhydrin-reactants and a combina-
n of one- and two-dimensional paper chromato-
phy. Glutamic acid content significantly de-
ased with treatment. Glutamine, valine and
cine significantly increased. Tyrosine, unde-
ted in controls, appeared faintly in treated
nples. Apparently such treatment with Zerlate
uces a metabolic shift wherein glutamic acid
reases in the leaves and accumulates in the roots
sugar-beets.—From authors' summary.

5 Tombesi, L. and others. Contributo allo studio del metabolismo di *Beta vulgaris* var. *saccharifera* in funzione della nutrizione nitrica ed ammoniacale. [**A contribution to the study of the metabolism of *Beta vulgaris* var. *saccharifera* in relation to nitric and ammoniacal nutrition.**] *Ann. Sper. agr.* 1952, **6,** No. 4, 1055-64, bibl. 7, illus., English summary pp. 1063-4.

6 Antonelli, C. Nuove possibilità di regolare l'intervento della concimazione azotata alla bietola da zucchero attraverso i saggi diagnostici con il reattivo Bray. [**New possibilities of regulating the amount of N fertilizer for sugar-beet through diagnostic tests with Bray's reagent.**] *Industr. saccar. ital.* 1952, **45,** No. 9-10, 344-53, bibl. 20, illus.

account is given of preliminary field trials
ied out at Corticella, nr. Bologna, Italy, in
ch the amount of N in sugar-beet was deter-
ed by petiole diagnosis with Bray's reagent. It
hought that this method could be employed to
ect differences in the amount of nitric N in
ar-beet.—E.B.O.

07 Toniolo, L. Ricerche sulla determinazione dell'azoto nitrico fogliare nella bietola da zucchero. [**Investigations on the determination of nitric nitrogen in the leaves of the sugar-beet.**] *Ann. Sper. agr.* 1952, **6,** No. 6, 1565-75, bibl. 6, illus., English summary p. 1574. [Ist. Agron. Gen., Univ. Padova, Italy]

nitrate content in the sap from leaf ribs was
ermined at intervals of 15-20 days during the
le vegetative cycle of sugar-beet. There
eared to be a great absorption of nitric nitrogen
e first stages of plant development, either when
nitrogen was applied to the soil as nitrate or as
nonium sulphate. The leaf ribs acted as storage
ans. The nitrate content in the sap decreased
dly in the later stages of development.—E.B.O.

1018 Bardinskaja, M. S. [**Formation of lignin in roots of sugar-beet.**] [Russian] *Izv. Akad. Nauk SSSR* (*Bull. Acad. Sci. USSR. Ser. Biol.*) 1952, No. 2, 111-20, bibl. 26, illus. [Bach. Biochem. Inst., Acad. Sci. USSR]

1019 Rasmusson, J. **Autotetraploid sugar beets. Vitality changes in subsequent generations.** *Hereditas, Lund.* 1952, **39,** No. 1-2, 257-69. [Hilleshög Sugar-Beet Breed. Inst., Landskrona, Sweden]

The studies reported concern the improvement in vitality with succeeding generations of polyploid sugar-beet plants produced by the flower-dipping method. A relatively sudden increase in vitality occurred between the F_3 and F_6 generations.—P.J.B.

1020 Orlovskiĭ, N. I. [**The effect of environmental training of sugar-beet on the productiveness of the succeeding generation.**] [Russian] *Izv. Akad. Nauk SSSR* (*Bull. Acad. Sci. USSR. Ser. Biol.*) 1952, No. 4, 31-42. [All-Union Sci. Res. Inst. Sugar-Beet, Kiev]

At the above Institute, heritable changes were obtained in the varieties I 1305E and V 23N when they were grown for seed under drought conditions. —From *Pl. Breed. Abstr.* 23 : 530.

1021 Aldrovandi, A. La concimazione della barbabietola da zucchero in Italia. [**The manuring of sugar-beet in Italy.**] *Industr. saccar. ital.* 1952, **45,** No. 5-6, 174-9.

1022 Aldrovandi, A. and Antonelli, C. La concimazione della barbabietola da zucchero in funzione del fabbisogno della coltura. [**The manuring of sugar-beet in relation to the requirements of the crop.**] *Industr. saccar. ital.* 1952, **45,** No. 7-8, 266-79, bibl. 45.

The problem of correct sugar-beet manuring in Italy is practically confined to P, which is insufficient in most soils. Wide-spread trials, carried out on soils of different texture and fertility in the Po Valley in 1950-1, showed that P manuring increased both yield and plant density significantly. From the 2 years' trials it was concluded that to obtain 300-500 or more q. of sugar-beet per ha. the P_2O_5 content of the soil should vary correspondingly from 130-200 kg./ha., while the K_2O content should be 170-200 kg./ha. Two-hundred-and-forty-eight manuring trials were carried out on local farms in 1951. In 52 of these trials, in which the yield from manured plots was compared with that from non-manured plots, 43% of the manured plots outyielded the non-manured plots by more than 10%, an increase of economic significance. In the remaining 196 trials the yield from plots in which the fertilizers were partly broadcast and partly placed beside the seed was compared with that from plots in which the fertilizers were all placed beside the seed. In these trials 20% of the former plots outyielded the latter by more than 10%.—E.B.O.

1023 Morani, V. and Francesconi, F. Secondo contributo sperimentale sulla concimazione alla bietola nel comprensorio di Foligno. [**Second experimental contribution to sugar-beet manuring in the Foligno district.**] *Industr. saccar. ital.* 1952, **45,** No. 7-8, 280-6, bibl. 5. [Ist. Chim. Industr. Agr., Univ. Perugia, Italy]

These trials were concerned with applications of N, P, K and boron. [See also *Fld Crop Abstr.* 4 : 773.]—E.B.O.

1024 Vlasjuk, P. A. and Lisoval, P. Z. [**The effect of different forms of potassium and other types of fertilizer on yields of sugar-beet and cotton under irrigation in the south Ukrainian SSR.**] [Russian] *Sovet. Agron.* (*Soviet Agron.*) 1952, **10,** No. 12, 19-26.

FODDER-BEET

1025 Fiddian, W. E. H. **Strains of fodder beet.** *J. nat. Inst. agric. Bot.* 1952, **6,** No. 2, 299-308.

A brief account is given of trials with fodder-beet and mangel varieties in Britain. The different types of varieties are reviewed, with particular reference to the systems of nomenclature in force in Denmark and Holland and to the agronomic character of the Danish, Dutch and Swedish varieties considered best suited to British conditions. Some aspects of fodder-beet cultivation are briefly noted, mainly from the standpoint of the results of trials carried out on the Continent.—P.J.B.

1026† Wageningen. State Institute for Research on Crop Varieties. Bericht over rassenkeuze No. 145. Voederbieten, 1953. [**Choice of varieties. Pamphlet No. 145. Fodder-beet, 1953.**] Suppl. 11, *LandbVoorl.* 1953, **10,** No. 4, 1-6.

A total area of 60,000 ha. (6.5% of the total arable area) was cropped with fodder-beet in the Netherlands in 1952. An account is given of the acreage occupied by 9 different groups of varieties. The group of varieties known as Groenkragen H.G. (green tops, high dry-matter), which have a dry-matter content of 14 to 17%, was by far the most extensively grown on all soil-types. The average performance for the years 1949-52, of individual varieties, including varieties still under test, are tabulated under the headings of average yield of roots, leaf, and dry matter (comparative figures), percentage dry matter in the roots, resistance to bolting, ease of lifting, and keeping quality. The highest average yield of dry matter per ha. was obtained from variety C.B.-H49-34 (still under test) a member of the Groenkragen H.G. group. Other varieties of the same group, Groeningia, Hollandia, Groenkraag, Eureka and Groenkraag C.B. were also outstanding for their yields of dry matter per ha. The highest yields of leaf were obtained from Rex X and Gulläker. These two varieties had a high dry-matter content in the root (18 and 19% respectively).—W.J.B.

TURNIP

1027 Kloen, D. Het groeiverloop van stoppelknollen. [**The development of August-sown turnips during growth.**] *LandbVoorl.* 1952, **9,** No. 9, 341-7, illus. [Pl. Breed. Sta., Wageningen]

5 Dutch varieties of turnips, sown in August, were harvested at weekly intervals from 18 September to 20 November. The average fresh weight, dry-matter content and yield of protein from leaves and root, per plant, were recorded at each harvest. It was found that whilst leaf development reached its peak in mid-October, root development was most rapid towards the end of November. The leaves yielded more dry matter than the root until frost caused the leaves to die off in November. The leaves yielded more protein than the roots. The variety Jobe gave the highest total yields of protein and dry matter.—W.J.B.

POTATO

1028 Terman, G. L. and others. **Rate of planting and thiourea treatment for seed potatoes in Maine.** *Bull. 505. Maine agric. Exp. Sta.* 1952, pp. 33, bibl. 10.

In trials during 1949-51, varying the spacing of cut potato setts from 5 to 9 in. had little effect on yields. Cut setts spaced 12 in. apart gave lower tuber yields than those spaced 5 or 9 in. apart. Net yields fell slightly as the spacing between setts was reduced from 9 to 5 in. The yield of seed tubers measuring less than 2.85 in. in length increased markedly as spacing in the row decreased. Increasing manurial treatment above 120 lb. N per ac. and 180 lb. per ac. of both P and K resulted in only slight yield increases, irrespective of seed spacing in the row. Dip-treatment of potato seed-pieces with 3% thiourea to break apical dominance, resulted in lower tuber yields in all cases, compared with untreated controls ; average yield decreases in 13 trials were 54 bu. per ac. Treatment of cut setts reduced yields more than did treatment of whole seed. Thiourea treatments tended to increase the yield of small tubers and markedly increased the

mber of stems per hill produced and, to a much
aller extent, the number of tubers produced per
l. From these trials it is concluded that, in Maine
nditions, for seed production, moderate applica-
ns of manure, together with close spacing of seed-
ces in the row, should be adopted. Thiourea
atments reduce mean tuber size, but also de-
ase total yields.—P.J.B.

29 Reestman, A. J. Is pootgoed van de kleine maat (25/28 mm) in de praktijk bruikbaar? [**Can small seed potatoes (25-28 mm. grade) be used in practice** ?] *LandbVoorl.* 1953, **10,** No. 4, 143-54, illus. [Cent. Inst. Agric. Res., Wageningen]

view of the high cost of seed potatoes of normal
e (28-35 mm. and 35-45 mm.) an analysis has
w been made of the results of 56 field experiments
rried out in the Netherlands in 1940-2 to deter-
ne the practicability of using small seed potatoes
the 25-28 mm. grade (25 mm. = 1 in.). The
lds from the 25-28, 28-35, 35-45 and 45-55 mm.
ades, all grown at rates of approximately 30-, 40-,
and 60-thousand plants per ha., were recorded.
rates of 40- and 50-thousand plants per ha. the
all-grade potatoes (25-28 mm.) yielded on the
erage 2.5 metric tons per ha. (1 ton per ac.) less
an the 28-35 mm. grade so that the saving in
d potatoes effected by using small seed was out-
ighed by the reduction in yield. Twenty-five to
enty-eight mm. grade seed planted at 60-
usand plants per ha. yielded 400 kg. per ha.
re than the 28-35 mm. grade planted at 40-
usand plants per ha. (the normal rate of plant-
) so that at present prices it is possible to obtain
higher financial return by planting 25-28 mm.
d with close spacing than by planting 28-35 mm.
d with normal spacing. In the same way the
erage yield of 28-35 mm. seed, closely spaced,
ualled that of the 35-45 mm. seed, normally
ced ; but the close spacing of 28-35 mm. seed is
likely to yield any financial advantage owing to
high cost of this grade. Crops grown from
ger seed matured earlier than crops from the
aller grades and for this reason the use of small
d is not recommended to growers who require
lift potatoes early. Graphs are shown illustrat-
the relationship between average yield and
e of planting in the case of each of the four sizes
seed at each of the four rates of planting. The
ght of seed required for each size of seed at each
e of planting is indicated. The general con-
sion reached is that the practice of using
28 mm. seed, closely spaced, is a safe one and
be recommended whenever financially ad-
tageous.—W.J.B.

0 Schleusener, W. and Goerlitz, H. Über den Einfluss verschiedener Anbaumethoden auf Ertrag und Pflanzgutwert der Kartoffel. I. Bericht : Ernte 1950/51. [**The effect of different cultural methods on the yield and planting value of the potato. 1st report ; 1950-51 crop.**] *Züchter* 1952, **22,** No. 4/5, 127-34. [Univ. Rostock]

Twenty potato varieties, not specially selected for absence of virus disease, were planted in isolated blocks A and B and the following 3 treatments tested : (a) sprouted tubers were planted early (17-19 April) and the tops were removed 3 or 4 weeks before maturity (Dutch method) ; (b) tubers were planted 10-11 May without any previous treatment and harvested when fully ripe (German method) ; (c) sprouted tubers were planted late (8 July), following a crop of legumes (Lyssenko's method). In Block A, the stands were continuously rogued for virus-diseased plants ; in Block B, all diseased plants were recorded and marked, but not removed until just before harvesting. The material thus obtained in 1950 was planted out in 1951 in such a way that the tubers from each treatment were also planted according to the 3 treatments, and the resultant crops were studied for yield and starch content of tubers, proportion of foliage and tubers, and virus disease. When virus-diseased plants were left out of consideration, yield and number of stems and of tubers over 3.4 cm. were little affected by method of cultivation, while starch content was entirely unaffected. Virus disease was most successfully kept under by method (a) ; method (c) failed in this respect, especially in regard to leaf roll. The X virus was most marked under treatment (b) and seemed to be less serious under treatment (c).—G.M.R.

1031 Scottish Plant Breeding Station. **Potatoes.** *Rep. (Abridged) 1952, Scot. Pl. Breed. Sta.* [n.d.], 24-5. [Edinb.]

A full description is given of the potato variety Pentland Ace, pp. 24-5. This new variety, a second early, was first registered in 1951. It was bred from *Solanum rybinii*, *S. demissum* and *S. tuberosum*. The official remarks on the potato are : "cropping good ; cooking quality good ; field immune from viruses X, A and B and from blight strains A, B, and C."—W.J.B.

1032 Gončarik, M. N. [**Comparative physiological evaluation of potato varieties.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, **20,** No. 1, 33-7, bibl. in text. [Igarsk Agric. Exp. Sta.]

This study of the physiological processes in potato varieties, which are grown under the conditions of the northern Eniseĭ area, shows that the local variety Marija Hrennikova is the most resistant to cold. This is indicated by the greater intensity of photosynthesis in this variety at temperatures below + 10°C. compared with the variety Kurjer which is a hardy type.—M.H.

1033 Ochoa, C. Dos nuevas especies silvestres de papas diploides del Peru. [**Two new wild species of diploid potatoes in Peru.**] [Latin and Spanish] *Rev. argent. Agron.* 1952, **19,** No. 4, 231-7, illus.

Two new wild species of diploid potato, *Solanum neohawkesii* and *S. rhomboidei-lanceolatum* are described in detail. Neither species is resistant to blight (*Phytophthora infestans*). *S. neohawkesii* is highly resistant to frost and has a pollen-grain fertility of 97%.—W.J.B.

1034 Hirt, W. Zur Bekämpfung der Kraut- und Knollenfäule der Kartoffel. [**The control of leaf and tuber rot** (*Phytophthora infestans*) **in potatoes.**] *Schweiz landw. Mh.* 1952, **30,** No. 6, 213-19, illus. [Landw. Genossensch. Kirchberg, Berne]

An account is given of measures taken in 1951 to control *Phytophthora infestans* in an area where potato growing is of considerable importance but subject to epidemics of disease, the spores of the fungus being carried by the prevailing north-west wind. Infected crops were uprooted, the remaining crops being sprayed from one to four times with copper preparations. The treatment, together with spraying against the potato beetle, increased the costs of production by 5%, but yield—taking the average as 100%—was (in bulk) 120 to 160%, or (in value) 120 to 151%. Where no control measures were taken, the corresponding figures for yield are given as 80 to 48% and 73 to 40%.—G.M.R.

1035 Roberts, O. **Water adsorption by potato leaves from fog.** *Brit. agric. Bull.* 1953, **5,** No. 23, 313. [Rep. Paper read at Brit. Ass. Ann. Meet. 1952.] [Univ. Coll., Cork]

It has been suggested that differences in the susceptibility of varieties of potatoes to potato blight are due to differences in the wettability of the leaves. An experiment was undertaken to test the uptake of water by potato leaves from fog as a means of predicting possible outbreaks of potato blight. Detached haulms of 3 varieties of potatoes, Up-to-Date, Sprys' Abundance, and Kerr's Pink (very susceptible, moderately susceptible and resistant to blight, respectively), were placed overnight in an American-type " fogger " and weighed when air-dry next morning. Rubber tubing and clips were used to seal the lower ends of the haulms. They were then allowed to wilt, were weighed and replaced in the " fogger." Changes in the water content of the leaves were confirmed by refractometer observations of the solids content of the leaf sap. Water was presumably taken up by evaporation from the menisci of drops of water covering the stomatal openings. Uptake and loss of water in general was about 5-10% of the original field weight of the haulm. Total uptake and water loss was greater in August than in June. There was little difference at either time between the 3 varieties used. All tended to show an increase in total water exchange after 2 or 3 days in the "fogger." This could probably be correlated with change in the texture of the leaves. Results of the experiment indicate that the difference in susceptibility to potato blight of different varieties of potato is not reflected in their water balance. Water absorption by leaves from fog may influence their water content thus bringing them into those ranges of water content in which infection by potato blight can take place.—K.L.

1036 Cunningham, H. S. **A histological study of the influence of sprout inhibitors on Fusarium infection of potato tubers.** *Phytopathology* 1953, **43,** No. 2, 95-8, bibl. 6, illus. [Pl. Path. Dep., Cornell Univ., Ithaca, N.Y.]

The treatment of the cut surfaces of potato setts with dust and liquid formulations of methyl ester of naphthaleneacetic acid delayed the normal healing of the cut tissues and did not inhibit the invasion of *Fusarium* sp. In the absence of sprout-inhibiting materials, the presence of *Fusarium* sp. in the cut tissues delayed the initiation of the healing process for a short time, but once initiated, healing proceeded normally. *Fusarium* was able to penetrate suberized tissues, but not the cork layer normally formed after suberization. Sprout inhibitors containing tetrachloronitrobenzene had less effect in delaying surface healing than the sprout inhibitors quoted above.—P.J.B.

1037 Wenzl, H. Untersuchungen über den nichtvirösen Kartoffelabbau. [**Investigations into potato degeneration not caused by virus disease.**] *Z. PflKrankh.* 1953, **60,** No. 2, 65-77, bibl. 13.

In the dry, warm districts of eastern Austria, Black dot disease (*Colletotrichum* sp.) of potatoes and the related leaf scorch were often followed by the seed tubers producing spindly sprouts (spindling or hair sprout). This condition leads to a progressive non-virus degeneration of the seed. Dwarfed plants from affected tubers were less affected by Colletotrichum wilt than normal plants. Trials showed that by late planting, the Colletotrichum attack was lessened and consequently the incidence of spindle sprout decreased.—M.A.

1038 Steineck, O. Der hydroponische Stecklingstest. Ergebnisse bisheriger Erfahrungen und neuerer Untersuchungen. [**The hydroponic steckling test. Experience to date and recent investigations.**] *Bodenkultur* 1951, **5,** No. 2, 161-73, bibl. 11, illus. [Hochsch. Bodenkultur, Vienna]

Some improvements are suggested in the technique of growing potato plantlets in water cultures for the detection of virus disease in seed-potato terial. Points studied are the nutrient solution, ans of interrupting dormancy, boxes for forcing stecklings, the further cultivation of the plant- s in nutrient solution, and the evaluation of the - to 20-day-old plants.—G.M.R.

39 STEINECK, O. Förderung des Blühreichtums und der Fruchtbildung bei Kartoffeln. [**Encouraging prolific flowering and fruit formation in potatoes.**] *Bodenkultur* 1951, **5,** No. 4, 449-58, bibl. 10, illus. [Hochsch. Bodenkultur, Vienna]

ree methods of promoting flowering and berry ting in potatoes were tested in the drier regions east Austria. (1) Grafting on tomato plants in glasshouse gave moderately satisfactory results ly. It is believed that the glasshouse conditions re too warm and that better results would be tained from early transference of the grafts to open. (2) The same conclusion was reached in ard to the inhibition of tuber formation by minating the lower extremities of the haulms. The use of 2,4-D, whereby the flowers of 20 rieties were sprayed 3 days after opening, gave re promising results. The concentration is of portance, a 0.1% solution being the most satis- tory of the 3 tested. The number of seed- ntaining berries per 10 plants ranged from 6 to) and, except in one case, greatly exceeded that the untreated plants.—G.M.R.

0 POHJAKALLIO, O. **On the effect of day-length on the yield of potato.** *Physiol. Plant.* 1953, **6**, No. 1, 140-9, bibl. 14, illus. [Pl. Path. Dep., Univ. Helsinki]

dies were made on the dependence of the effect photo-periodic treatments made to potatoes on length of the growing period at 3 locations in land at latitudes 60°N., 67°N. and 69°N., re- ctively. Ten-hr. day lengths were compared h natural day lengths at these locations. The ato varieties used included 3 *Solanum tuber- m* varieties, 5 *S. demissum* × *S. tuberosum* F_1 rid clones, a commercial variety derived from nter-species hybridization and *S. demissum*. The g natural day lengths inhibited tuber forma- n in *S. demissum*, but had little effect on tuber iation in the 3 *S. tuberosum* varieties. Natural lengths either prevented, or markedly retarded, er initiation in the F_1 clones. Once tuber initia- n had taken place, tuber yields were increased re by the natural day-length treatments than the 10-hr. day lengths, where the growing season tinued late into the autumn. Natural day gths increased top growth and delayed the turation of the tops of all varieties, compared h 10-hr. day lengths. Tuber formation in the r-species hybrids appeared to be conditioned by toperiod, but after the tubers had formed, tuber lds were primarily dependent on the energy nomy of the plants.—P.J.B.

1041 LONA, F. and others. Regime termoperiodico giornaliero e concentrazione endocellulare nelle foglie e nel fusto di *Solanum tuberosum* L. (var. Bianca di Como). [**Daily thermoperiodic regime and endocellular concentration in the leaves and stem of *Solanum tuberosum* L. var. Bianca di Como.**] *Nuovo G. bot. ital.* 1952, **59,** No. 1, 169-71, bibl. 4, English summary pp. 170-1. [Ist. Bot., Univ. Parma, Italy]

Preliminary results are given from trials in which one lot of potato plants was grown under the thermoperiodic conditions prevailing in the Po plain, i.e., day temperature 22-25°C. and night temperature about 20°C., and another lot under Alpine conditions, i.e., day temperature 22-25°C. and night temperature 4-8°C. The concentration of the sap from plants kept under cold night conditions was found to be higher than in the plants kept under warm night conditions.—E.B.O.

1042 LEVITT, J. **Two methods of fractionating potato tuber proteins and some preliminary results with dormant and active tubers.** *Physiol. Plant.* 1952, **5,** No. 4, 470-84, bibl. 8. [Univ. Missouri, Columbia]

Two methods of fractionating the protoplasmic proteins of potato tubers are described, the first based mainly on filtration through celite and the second and more accurate method based on high-speed centrifuging. Studies were made, using both methods, of the changes in the content of different protoplasmic protein fractions in potato tubers held for different periods at 3°C. before being transferred to 26°C. to break dormancy and induce sprouting. Transferring potato tubers from a temperature of 3°C. to 26°C. after 1-3 months storage resulted in an increase of some 20% in crude protein content within 10 days of transfer to the higher temperature. After storage at 3°C. for 9-12 months, transfer to a temperature of 26°C. for 10 days resulted in a decrease of from 9-13% in crude protein content. Tubers held at 26°C. showed a steady decline in crude protein content, which immediately became more marked as soon as sprouting occurred.—P.J.B.

1043 FORWARD, Dorothy F. **The response of potato tubers to a period of anaerobiosis. I. Drifts in carbon dioxide production.** *Canad. J. Bot.* 1933, **31,** No. 1, 33-62, bibl. 21. [Bot. Dep., Univ. Toronto, Ontario]

1044 SPIERINGS, F. H. and others. **Applications of the diaferometer technique to studies on the gas exchange and the carbon dioxide content of potato tubers.** *Meded. LandbHogesch., Wageningen* 1952, **52,** No. 3, 93-104, bibl. 12, illus.

A method of measuring rates of the oxygen and carbon dioxide exchange of potato tubers by a modification of the diaferometer technique is described. The diaferometer may also be used for comparing the CO_2 status of tubers which have undergone different pre-treatments. The method involves cutting the tubers in an atmosphere containing different concentrations of CO_2. When the CO_2 concentration is relatively low, CO_2 in the intercellular space diffuses out into the surrounding gas. When the CO_2 concentration is relatively high, CO_2 diffuses into the tuber. It is possible to choose a concentration of CO_2 in the external gas phase such that no diffusion into or out of the tuber occurs. When this equilibrium is established the external concentration of CO_2 must correspond closely to the concentration of CO_2 in the intercellular space of the potato tuber. In the experiments reported it was found that the CO_2 concentration in the internal gas spaces was approximately 1%. There is preliminary evidence that this value is liable to variation with respect to season and pre-treatment.—Authors'summary.

1045 Sprau, F. Elektronenoptische Darstellung des Blattrollvirus der Kartoffel mit einem kurzen Überblick über die Elektronenmikroskopie in der Virusforschung. [**Electro-optical description of leaf roll virus of potatoes with a short review of electron-microscopy in virus research.**] *Z. Pflbau* 1952, **3,** No. 5, 213-21, bibl. 15, illus. [Bayer. Landw. Pflbau]

Different methods for the extraction of plant sap from potato leaves are given in relation to their suitability for electron-microscopical examination. —M.A.

1046 McCall, W. W. and Davis, J. F. **Foliar applications of plant nutrients to crops grown on organic soils.** *Quart. Bull. Mich. agric. Exp. Sta.* 1953, **35,** No. 3, 373-83, bibl. 11.

In field and greenhouse trials, foliar spray applications of N, P, K, Mg, Mn, B and Zn were made to 3 horticultural crops ; and to sugar-beet and potatoes grown on organic soils in Michigan. With potatoes, 1.2, 1.8 and 2.4% solutions of urea were applied, giving 17, 25.5 and 34 lb. N per ac., and were compared with top-dressings of ammonium nitrate giving 48 lb. N per ac. Respective average yields were 424, 432, 512 and 539 bu. per ac. Zinc sulphate sprays applied at a rate of 16 lb. per ac. reduced potato yields below those of untreated controls. Mn treatments had no significant effect on the yield of potatoes or sugar-beet. The addition of 4 lb. magnesium sulphate, 2 lb. manganese sulphate and 1 lb. borax per 100 gal. of Dithane spray per ac. increased potato yields by 100 bu. per ac. over controls.—P.J.B.

1047 Jameson, H. R. and Peacock, F. C. **Taint in potatoes grown on land treated with technical γ- benzene hexachloride or pure γ-benzene hexachloride.** *J. Sci. Fd Agric.* 1953, **4,** No. 2, 102-4, bibl. 1, illus. [I.C.I., Ltd., Jealott's Hill Res. Sta.]

1048 Ildis, P. Le problème de la conservation des pommes de terre. [**The problem of potato storage.**] *Terre maroc.* 1953, **27,** No. 279, 55-61, bibl. 27. [Lab. Froid Conserv., Casablanca, Morocco]

The problem of storing potatoes in Morocco for food and for planting is reviewed.—E.B.O.

1049 Kidd, F. and others. **Food investigation 1951.** 1952, pp. 39, bibl. 93, London ; Food Invest. Org. DSIR.

The storage of potatoes in bulk in a corrugated-iron building lined with straw bales was investigated in 1950-1. The distribution of temperatures in stacks of potatoes stored in this way did not appear to be much different from that of potatoes stored in wooden bins in a brick building in previous years. It has been found that if the volatile products of stored potatoes are allowed to accumulate in the storage atmosphere until the carbon dioxide reaches a concentration of about 5%, sprouting is depressed. This effect is not due to the carbon dioxide (the specific effect of which is actually to accelerate the growth of sprouts) but to the accumulation of other volatile products of respiration. Attempts are being made to identify these. The accumulation of these volatile substances alone, the carbon dioxide being removed from the storage atmosphere, leads to complete inhibition of sprouting.—Extract.

SWEET POTATO

1050 Cordner, H. B. **Allgold. A new, high vitamin, high yielding sweet potato.** *Bull. B*-388. *Okla. agric. Exp. Sta.* 1952, pp. 11, illus.

Allgold is a new, high-yielding, yam-type sweet potato produced for Oklahoma conditions, where it has produced almost twice the yields and contained 50% more vitamin C than No. 1 Porto Rico in trials during 1948 and 1949. Allgold is early maturing, has a high vitamin A content (an average of 48.8 mg. per 100 g. dry weight in 2-years' trials), is resistant to stem rot, but susceptible to nematode attack. This variety is a table, or market, type and is suitable for canning.—P.J.B.

1051 Venkataratnam, L. and Satyanarayanamurthy, K. **Science notes and news. A simple method of germinating sweet potato seeds.** *Curr. Sci.* 1953, **22,** No. 1, 29. [Coll. Agric. Bapatla, Madras] e majority of seeds from hybrids of different nes of sweet potato (*Ipomoea batatas*) are hard- ted and do not germinate, even after months of rage. By treating the seeds with sulphuric acid vas found possible to obtain 60% germination as inst 4-5% in the case of untreated seeds. Moist ds were dropped into a quantity of concentrated phuric acid just sufficient to soak the seeds ich were allowed to remain in the acid 10 min. ore being washed in water. The seeds can be vn immediately after treatment. Dry seeds are s responsive to the treatment than moist ds.—W.J.B.

52 Nielsen, L. W. **Cooler temperatures stop cork [in sweet potatoes].** *Res. Fmg, N. C.* 1951, **10,** No. 2, 6-7, illus. [Received 1953]

e results are reported of 2 years' studies on the ect of different storage temperatures on the velopment of corky spot in sweet potatoes, ised by a virus disease that has become wide- ead in N. Carolina. The results showed that rage at a temperature of 55°F. for up to 9 nths limited the development of corky spot to t present in the tubers at the start of storage. rage temperatures of 70 and 85°F. resulted in a isiderable increase in the size of corky-spot ons. Storage temperatures of 50°F. resulted in development of pithiness in the tubers.—P.J.B.

OIL CROPS

NSEED

3 Culbertson, J. O. and others. **Seed-flax production in the north central States.** *Fmrs' Bull. 2036. U.S. Dep. Agric.* 1952, pp. 21, illus.

account is given of the history and adaptation linseed in the USA and the varieties in use there. commendations for the cultivation of the crop made and a review is given of the main diseases linseed, including wilt (*Fusarium lini*), rust *elampsora lini*), pasmo (*Sphaerella linorum*), hracnose (*Colletotrichum lini*), stem break *lyspora lini*), seedling blight and heat canker ether with notes on their control.—P.J.B.

4 McGregor, W. G. **Varieties of linseed flax [in Canada].** *Publ. 884. Canad. Dep. Agric.* 1953, pp. 4.

ef notes are given on the characteristics and ions of adaptation in Canada, of Bison, Dakota, rine, Redwing, Rocket, Royal, Redwood, Shey- e, Victory and Viking.—P.J.B.

5 Denmark. Statens Forsøgsvirksomhed i Plantekultur. Medd. No. 479. Forsøg med stigende maengder kalksalpeter til oliehør 1948-1951. [**Trials with increasing amounts of nitrochalk applied to linseed, 1948-1951.**] *Tidsskr. Planteavl* 1952, **56,** No. 1, 163-4.

In trials at 3 locations in Denmark, linseed was grown on clay-loam soil and received nil, 200, 400, 600 and 800 kg. per ha. of nitrochalk. With one exception, the previous crop was well-manured roots: a basal manurial treatment of 200 kg. per ha. superphosphate and 200-300 kg. per ha. of K salts was given to the linseed. Seed yields on plots receiving nil, 200, 400, 600 and 800 kg. per ha. nitrochalk averaged 14.1, 17.3, 19.0, 19.5 and 19.1 hkg. per ha. (corrected to 90% dry-matter content). The tendency to bolt, on a scale of 0 to 10, was 0.3, 1.2, 1.5, 3.2 and 4.1, respectively. The oil content of the seed from the controls and the different N treatments was 40.9, 40.2, 38.9, 38.3, and 37.5%, respectively. The iodine number declined progressively from 196 to 784 as N treatments increased, while the crude-protein content of the seed rose by 4%. From these results, it is concluded that amounts of 400 to 500 kg. per ha. of nitrochalk are suitable for linseed after root crops, where the tops are removed, and somewhat more N after cereal crops. About half this amount is needed after clover/grass crops, under Danish conditions.—P.J.B.

WILD SAFFLOWER

1056 Deshpande, R. B. **Wild safflower (*Carthamus oxyacantha* Bieb.) — a possible oilseed crop for the desert and arid regions.** *Indian J. Genet. Pl. Breed.* 1952, **12,** No. 1, 10-14, bibl. 11, illus.

Wild safflower (*Carthamus oxyacantha*) is widely distributed in the arid regions of Pakistan and Northern India. It is generally treated as a weed of field crops but its seeds are sometimes collected for producing an edible oil. The oil content of wild safflower seeds is reported to be 28%. A comparison is made between the general characteristics and seed-bearing capacities of wild safflower and cultivated safflower (*Carthamus tinctorius*). The 100-seed weight of the cultivated species is greater than that of the wild species. The two species are easily crossed to give a vigorous hybrid plant. The author considers that wild safflower has possibilities as an oil-bearing plant for arid and desert areas where no other crop can be grown.—W.J.B.

RAPE

1057 Wahlin, B. Frostskador på blommande höstraps. [**Frost injury to flowering winter rape.**] *Vaxtskyddsnotiser* 1952, **6,** No. 5, 92-5.

Some results are given of limited studies in 1952 in

Sweden on frost damage to the flowers of Lembke's winter rape [*Brassica napus* var. *oleifera* subvar. *biennis*] following exposure in the field in May to temperatures below 0°C. Exposure to 0°C. at the time the flower buds were half-opened resulted in an average of 29% aborted fruits, while exposure when the flower petals were withered resulted in 54% aborted fruits.—P.J.B.

1058 HÖRBERG, Y. Weibulls Margo. Ny höstraps. [**Weibull's Margo. A new winter rape.**] *Weibulls ill. Årsb.* 1953, **48,** 33.

A note is given on Margo winter rape [*Brassica napus* var. *oleifera* subvar. *biennis*], a winter-hardy selection from Matador. Margo has outyielded Lembke and Matador by 4-5% in trials during 1951-2, is slightly earlier in maturing than Matador, shorter than Regal and more stiff-strawed than either Matador or Regal, according to limited trials at Weibullsholm.—P.J.B.

1059 EBBE-NYMAN, Elene. Rapsjordloppan *Psylliodes chrysocephala* L. Bidrag till kännedom om dess biologi och bekämpning. [**Cabbage stem flea-beetle *Psylliodes chrysocephala* L. A contribution to the knowledge of its biology and control.**] *Medd. 63. Statens Vaxtskyddsanstalt.* 1952, pp. 103, bibl. 44, illus.

The studies reported were carried out during 1949 to 1951 at Åkarp, near Malmö, in south Sweden. A review is given of the life history of the cabbage stem flea-beetle, which has become a serious pest of oilseed rape in Sweden. In measures to control the imago stages of the flea-beetle, a 5% DDT preparation, a mixture of DDT and BHC (containing 4-5% DDT + 10-14% technical BHC with 10-15% gamma isomer content) and a Parathion-like material containing 2% dialkyl-p-nitrophenyl thiophosphate were used. The BHC + DDT mixture was more effective than DDT alone. The best control followed harrowing into the soil at sowing time, 15 kg. per ha. of a 25% BHC dust containing 13-15% gamma isomer. This treatment resulted in a 90% reduction in larval numbers 5 months after application. In trials with measures to control larval stages of the flea-beetle, 5% DDT, 20-25% technical BHC with 13-15% gamma isomer, and dusts containing 2% of a 35% dialkyl-p-nitrophenyl thiophosphate formulation were used. The Parathion-like material used as a dust at 10 kg./per ha. gave good control of larvae during autumn, and during spring when plant stands were weak and larvae still in their first stage. Where thiophosphate materials are used for larval control, it is recommended that the larvae should not have left stage 1 and the temperature for one week after treatment should not be lower than 5°C. Control of stages 2 and 3 varied considerably in effectiveness, but at best was only fairly good.—P.J.B.

1060 TOGARI, Y. and KANNO, C. [**Development histology of rape plant, *Brassica napus* L.** [Japanese] *Bull. nat. agric. Sci. Ser.* 1952, No. 2, 1-39, bibl. 8, illus., Englis summary pp. 37-9.

An account is given of the histology of rap (*Brassica napus*) from the seed stage to flowerin —W.J.B.

1061 OLSSON, G. Undersökning av graden a korsbefruktning hos vitsenap och raps [**Investigations of the degree of cross pollination in white mustard and rape.** *Sverig. Utsädesfören. Tidskr.* 1952, **62,** No. 311-22, bibl. 13, English summary p. 322.

Rape (*Brassica napus* var. *oleifera*), flowerin freely in the field, was about 66% self-pollinate and 33% cross-pollinated by neighbouring plants Under the same conditions, white mustard (*Sinapi alba*) was 99.6% cross-pollinated. In large fiel plots (10 × 1.8 m.), 29% of plants were selfed compared with 43% on small plots (2 × 1.2 m.) It was considered that isolation of white mustar plants in insect-proof, but not pollen-proof, greenhouses and cages gave protection against crossin equal to that obtained from spacing plots 60 m apart. White mustard plants in insect-proof greenhouse cages set pods on an average of 65% of th flowers, with 2.46 seeds set per pod. The inclusion of bees in the cages increased these figure to 95% and 4.08, respectively. White mustar pollen spread to only a small extent beyond 1 m from individual plants. It is considered that th incidence of cross-pollination may vary considerably between different strains of white mustard and rape, and, as new, recessive strains ar bred, this factor should be investigated for eac strain.—P.J.B.

OTHER

1062 BRØNDEGAARD, V. J. En vildplant taemmes. [**A wild plant (cockle-bur) i tamed.**] *Ugeskr. Landm.* 1953, **98,** No. 1 290-1.

A note is given on investigations in the East Zon of Germany into the possibilities of cocklebu (*Xanthium* sp.) as an oil-seed crop. The seed i reported to contain 35-7% edible oil and 42-4 crude protein. Yields are reported to be at leas as high as those of oil-seed rape and the crop is sai to produce high yields on soils poor in P and Ca.—P.J.B.

FIBRE CROPS

COTTON

1063 SVENSON, B.-G. Utvecklingstendenser inom det Amerikanska Bomullsbältet med sär skild hänsyn tagen till Texas. [**Developmental tendencies in the American Cotton Belt, with particular reference to Texas.**] *Svensk geogr. Årsb.* 1952, **28,** 65-89, bibl. 27, illus., English summary 87-9.

otton production over the whole of the Cotton elt is reviewed. A detailed examination is made current trends in production in Texas, with rticular reference to the shift in cotton produc-on westwards from the relatively backward lacklands area, to the High Plains region, where rm incomes, production per acre and mechaniza-on are at a relatively high level.—P.J.B.

64 BROWN, C. H. **The cotton problems of French North Africa.** *Emp. Cott. Gr. Rev.* 1953, **30,** No. 1, 37-9.

he production of suitable early-maturing varieties d the control of spiny bollworm (*Earias* sp.) are e main problems of cotton growing in French orth Africa. Much has still to be learned regarding wing date, spacing, irrigation and varieties.—K.L.

65 CHEVALIER, A. Les transformations récentes de la culture du cotonnier dans le monde. [**Recent changes in cotton cultivation in the world.**] *Rev. int. Bot. appl.* 1952, **32,** No. 359-60, 405-26, bibl. 24. [Mus. nat. Hist. naturelle, Paris]

66 PATEL, G. B. and PATEL, C. T. **Long staple cotton from hybrid seed of crosses between '*hirsutum*' and '*barbadense*' species.** *Indian Cott. Gr. Rev.* 1952, **6,** No. 4, 205-10, bibl. 4, illus.

order to gauge the possibility of growing cotton 1.125 in. staple (now imported from abroad) in dia, experiments were carried out in 1948-51 in e Surat and Kaira districts of Bombay Province determine whether long-stapled hybrid ***hirsutum*** *barbadense* cottons could be successfully grown. he results of all the trials showed that crops of 2 × Sea Island F_1 would yield as well as Co2 der suitable conditions. Over the whole period e hybrid cotton gave an average yield of 770 lb. r ac. seed cotton with a ginning percentage of .3% and a staple length of 1.39 in. in the Surat lack soil) district and 1401 lb. per ac. seed cotton th a ginning percentage of 24.4% and a staple gth of 1.38 in. on sandy loams in the Kaira strict. Irrigation, where monsoon rains were insfficient, and control of jassid attack by suitable raying were necessary for the successful growing the hybrid crop. It was also found that prensoon sowing of the hybrid seed gave better sults than monsoon sowing, where irrigation was ed. Wide spacing of the hybrid crop (6 × 6 ft. to × 6 ft.) and heavy applications of manure ve optimum results. Owing to the cost of producing hybrid seed, it is suggested that propagation of hybrids by ratooning or by cuttings might be adopted.—W.J.B.

1067 NAIK, R. J. **Virnar. The new variety of improved cotton for Khandesh.** *Farmer, Bombay* 1953, **4,** No. 1, 19-21.

The results of trials held on heavy and light soils in the Khandesh area of Bombay Province from 1943-7 in which the cotton variety Virnar (also known as 197-3) was compared with an established variety, Jarila, are reported. Virnar cotton yielded 15-22% more seed cotton, 28-35% more lint, with 4.4 higher ginning percentage, and gave 31-35% more profit than Jarila. The quality of Virnar cotton is also better than that of Jarila. Virnar is resistant to wilt.—W.J.B.

1068 IVY, E. E. and SCALES, A. L. **Insecticides for cotton leafworm control.** *J. econ. Ent.* 1952, **45,** No. 6, 1087-8, bibl. 2. [Texas Agric. Exp. Sta.]

Tabulated results are given from 11 years' trials in which several insecticides were tested for controlling the cotton leafworm, *Alabama argillacea*.—E.B.O.

1069 TARR, S. A. J. **Seed treatment against blackarm disease of cotton in the Anglo-Egyptian Sudan. 2. Steeping and slurry methods of seed treatment and the effects of water steeping on germination of cotton seed.** *Emp. Cott. Gr. Rev.* 1953, **30,** No. 2, 117-32, bibl. 9.

Better control of seed-borne blackarm disease (*Xanthomonas malvacearum*) was obtained by using mercuric chloride-iodide as a steep for cotton seed than as a dry powder dressing. Water-soluble organo-mercurial slurries when applied to acid-delinted seed also gave effective blackarm control. —From author's summary.

1070 WICKENS, G. M. **Bacterial blight of cotton.** *Emp. Cott. Gr. Rev.* 1953, **30,** No. 2, 81-103, bibl. 53.

Factors influencing the occurrence of infection, the development of bacterial blight (*Xanthomonas malvacearum*) within the cotton plant, the carry-over effect from one season to another, dissemination of the disease and control methods are reviewed.—M.A.

1071 DASTUR, R. H. and others. **Investigations on the red leaf disease in American cottons. 2. Red leaf disease in American cottons in Malwa and Bombay-Karnatak.** *Indian Cott. Gr. Rev.* 1952, **6,** No. 4, 193-204, bibl. 7.

An investigation into the causes of red leaf disease in American Upland cottons was carried out at Indore (Malwa cotton tract) and Gadag (Bombay-Karnatak). Different causal factors appeared to be responsible for the disease in the two tracts. At Indore the development of red pigment apparently occurred as a result of senescence of the leaves brought about by the depletion of food reserves in the plant which accompanies the maturation of the bolls. The disease occurred at the fruiting stage and was hastened by the application of ammonium sulphate to the soil which also hastened the maturing of the crop. De-budding of the plants, to maintain them in the vegetative stage, decreased the incidence of red leaf disease. At Gadag the disease appeared (much earlier than at Indore) at the time of bud-formation. Since at Gadag the disease became less intense with the further maturation of the plant and since de-budding of the plants did not reduce the incidence of the disease, it was concluded that red leaf disease was not related to the maturation of the bolls in that locality but must be ascribed to mechanical damage of the leaves by wind. At Gadag, contrary to the experience at Indore, it was not found possible to hasten the onset of the disease by the application of ammonium sulphate to the plots.—W.J.B.

1072 BASKIN, A. D. **The effect of 2,4-D applied to field-grown cotton at various stages of growth.** *Proc. 7th N.E. Weed Contr. Conf. 1953* 1953, 23-31, bibl. 4. [Virginia Tidewater Fld Sta., Holland, Va]

Trials were carried out during 1952 to determine the effect of different concentrations of 2,4-D sodium monohydrate salt on the growth and yield of Coker 100 Wilt cotton. The 2,4-D concentrations used were nil, 5, 10, 25, 50, 100, 200, and 500 ppm. acid equivalent and the plants were sprayed to run-off. One series of plots was sprayed when the first two true leaves had appeared. A second series was treated at this time and again when flowers appeared. A third series was treated once when flowers appeared. The reaction of the cotton plant in terms of growth disturbances was proportional to the amount of herbicide applied at any one time. Plants treated twice in the season were more severely affected than those treated once, while those treated at the early growth stage were less affected than those at the flowering stage. Treatment at the 2-leaf, and at the 2-leaf as well as flowering stage delayed maturity. Sprays applied at the time of formation of squares and flowers resulted in reductions of numbers of flowers and squares, boll set, and yield ; plants sprayed at the 2-leaf stage were relatively little affected in these respects. Mean lint yields for controls and for plants receiving 5 ppm. 2,4-D acid equivalent at the 3 times of treatment given above were 463, 108 and 226 lb., respectively, compared with 704 lb. per ac. for controls ; yields were further reduced as concentrations increased, though least severely following treatment at the 2-leaf stage.—P.J.B.

1073 BALASUBRAHMANYAM, R. and KANNIYAN, K. **Vegetative propagation of cotton.** *Indian Cott. Gr. Rev.* 1952, **6**, No. 4, 184-6, bibl. 2, illus.

The possibilities of exploiting the vigour of hybrid cottons by the vegetative propagation of selected hybrids are discussed. An experiment was carried out in 1949 in which the cotton yielded by plants grown from various types of cuttings treated with 0.3% indol-butyric acid (Seradix B) was compared with that yielded by plants grown from untreated cuttings and from seed. All cuttings, which measured 1.0, 0.7, 0.5 or 0.4 cm. in girth, were taken from 10-months-old plants of the variety Cambodia 2. Treated cuttings, cut from the main plant-axis and having a girth of 1 cm. gave stands and yields of cotton equal to those obtained from plants grown from seed, and greater than those obtained from other types of cuttings treated or untreated. In all cases treated cuttings gave higher yields than untreated cuttings. There was no significant difference in the quality of cotton resulting from the different treatments. It is suggested that hybrid cottons could be grown on a small scale as perennials from cuttings treated with indol-butyric acid.—W.J.B.

1074 SESHADRI AIYANGAR, G. **Origin and development of lint and fuzz in cotton.** *Indian J. agric. Sci.* 1951, **21**, No. 4, 293-311, bibl. 40, illus. [Received 1953] [Cott. Breed. Sta., Coimbatore]

A study was made of the origin and development of epidermal and stomatal hairs growing on the seed-coats of 29 varieties of wild and cultivated cottons, including linted and lintless, fuzzy and naked types. Ovules were collected and examined from 2 days before flower-opening up to the day of boll-opening. 16 hr. before flower-opening some epidermal cells could be distinguished from normal epidermal cells by their larger size and larger and more compact nuclei. These enlarged epidermal cells were primordial lint cells and were observed in all varieties except lintless Hirsutum (*Gossypium hirsutum*). Cotton varieties were found to differ in the size and depth of the air chambers underlying the stomatal pores which occur on the ovular coats. In Sea Island cotton (*G. barbadense*) the guard cells were smaller and the air-cavities shallower than those of Cambodia cotton (*G. hirsutum*) variety Co2. On the eleventh day after flowering, hair formation was observed occurring at the stomatal pores of ovules in fuzzy-seeded varieties. Mesophyll cells, bordering the air-chamber of the stoma, multiplied and filled the air-chamber with daughter cells, one of which protruded through the stomatal pore as a hair. The bases of the stomatal hairs were broader than those of the epidermal hairs and lay below the level of the epidermal cells. No stomatal hairs were obved in naked-seeded types such as Sea Island. G. *hirstum* var. *purpurascens*, a partially naked riety, there were only a few stomatal hairs. The d cottons (which have short brown hairs on the d) were found to have both epidermal and matal hairs growing on the ovular coats. Of the lintless varieties of cotton, four had both epi- rmal and stomatal hairs and could thus be classed "fuzzy-seeded," two, Dharwar lintless and lisonii lintless, had short epidermal but no matal hairs and represent therefore the "naked- eded" type among lintless cottons while one, intless Hirsutum," also a "naked-seeded" type, d no stomatal hairs and very few epidermal hairs. e lintless condition was associated with one or re of the following factors: (a) the absence of mordial epidermal hair-cells, (b) disorganization d separation of the epidermal layer (in the case Punjab glabrous lintless), (c) delayed formation d development of hair-cells, (d) low rate of ngation and early cessation of growth of hair- ls. The fuzz of cotton seed is composed of both matal and short epidermal hairs.—W.J.B.

75 EATON, F. M. and ERGLE, D. R. **Fiber properties and carbohydrate and nitrogen levels of cotton plants as influenced by moisture supply and fruitfulness.** *Pl. Physiol.* 1952, **27,** No. 3, 541-62, bibl. 20, illus. [Coll. Sta., Texas and Shafter, California]

stricting the number of bolls on cotton plants to o, and limiting the water supply, increased bohydrate levels and nitrogen in the plants; t there was the distinction that partial defloration not limit the rate of carbohydrate utilization in getative growth and in the remaining two bolls, ereas drought did. In an experiment that in- ded 5 varieties, those varieties showing the atest growth and having the greatest fibre ength had the lowest carbohydrate levels in the ms. Within the varieties, however, the treat- nts [boll restriction and drought] that increased carbohydrate levels also increased the fibre ength. The fibre strength was thus improved by plant enzyme systems favouring rapid, carbo- rate utilization and by the treatments that reased the carbohydrate supply.—From authors' nmary.

6 JEWITT, T. N. **Seasonal variations in the composition of young cotton leaves in the Sudan Gezira.** *J. agric. Sci.* 1953, **43,** No. 1, 89-91, bibl. 11. [Minist. Agric., Sudan]

e composition and weight of young cotton leaves fixed age are given for the three years 1949-52. erent amounts of rainfall were experienced each r before the sowing of the cotton. Results of the eriment suggest that the early growth of cotton inversely related to the pre-sowing rainfall and in accordance with the expected effects of this rainfall on the physical condition and surface nitrates of the soil. The final yields of cotton were inversely related to the early growth and percentage composition of the crop. It is pointed out that in a year of heavy rainfall before sowing, surface soil nitrates are low. This accounts for the smaller amounts of N taken up by the plants. In years with a high rainfall before sowing, the physical condition of the soil is poor and this results in poor growth of the plants and low uptake of nutrients other than N. In the Sudan Gezira, the yields of irrigated cotton are positively correlated with the amount of rainfall in the 6 weeks before sowing.—K.L.

1077 ERGLE, D. R. and MCILRATH, W. J. **Response of the cotton plant to late and localized applications of maleic hydrazide.** *Bot. Gaz.* 1952, **114,** No. 1, 114-21, bibl, 16, illus. [Texas. Agric. Exp. Sta.]

Maleic hydrazide was applied weekly to the apical buds and leaves of cotton plants during the first 4 weeks of flowering. Maleic hydrazide reduced growth in height, number of nodes on main stem, length of vegetative branches and number of fruiting branches; its use increased the number of vegetative branches, length of the fruiting branches and the number of flowers during late flowering.—From authors' summary.

FLAX

1078 DEMIDOV, S. [**Further development of the flax industry in collective farms.**] [Russian] *Soc. selјs. Hoz.* (*Social. Agric.*) 1952, **23,** No. 6, 11-19, bibl. in text.

The history of the production of fibre flax and linseed in USSR is outlined. Future development of the flax industry is discussed in relation to the growing of field crops and to the need for introducing a ley system of farming in many regions. The role of the Machine Tractor Stations in this development is also discussed.—M.H.

1079 DETROUX, L. Utilisation et influence des herbicides sélectifs sur les cultures de lin à fibres. [**Use and effect of selective weed-killers on flax.**] *Rev. Agric., Brux.* 1952, **5,** No. 10, 1063-71, bibl. 3.

Varying concentrations of MCPA, DNOC and DNBP were applied in spray form to flax from the cotyledon stage to the time of maturity. Observations were made on the state of the plants during growth and an assessment of fibre quality made. MCPA at strengths of up to 400 g. in a water solution of 1000 l./ha., the sodium salt of DNOC at strengths of up to 1800 g. in a water solution of 700 l./ha., and DNBP at strengths of up to 540 g. in a water solution of 800 l./ha. were used without damage either to the plant or its fibre.—M.A.

1080 Kostrubin, M. V. [**Pectin substances and hemicelluloses in flax stems.**] [Russian[*Biohimija* (*Biochemistry*) 1953, **18,** No. 2, 175-83, bibl. 9.

HEMP

1081 Robinson, B. B. **Hemp.** *Fmrs' Bull. 1935. U.S.Dep. Agric.* 1952, pp. 16, illus.

Recommendations are given for the cultivation and harvesting of hemp (*Cannabis sativa*) in Kentucky and Wisconsin, together with information on the determination of the retting end-point in the field.—P.J.B.

1082 Zaïcev, V. [**Development of the hemp industry.**] [Russian] *Soc. seljs. Hoz.* (*Social. Agric.*) 1952, **23,** No. 9, 17-21.

An account is given of areas in USSR which are utilized for the production of *Cannabis sativa*. Measures for cultivating the crop and plans for improving the industry are discussed.—M.H.

JUTE

1083 Colonial Plant and Animal Products. **Reports of recent investigations at the Colonial Products Advisory Bureau. Jute from the Gold Coast.** *Colon. Pl. Anim. Prod.* 1952-3, **3,** No. 1, 46-9. [Ashanti Cent. Agric. Sta.]

An account is given of the experimental cultivation of jute in the Gold Coast. Three kinds of jute, *Corchorus capsularis*, *C. olitorius* and *C. olitorius* var. ECR 576 were grown. There is a detailed report on the physical properties of fibre samples, which were generally found promising for industrial purposes.—W.J.B.

1084 Sen Gupta, J. C. and Gita Sen. **Further investigations on the photoperiodic effect in jute.** *Indian J. agric. Sci.* 1952, **22,** No. 1, 1-32, bibl. 46, illus. [Bot. Lab. Presidency Coll., Calcutta]

Jute (*Corchorus olitorius* and *C. capsularis*) was subjected to the following photoperiodic treatments in pot experiments : (a) continuous treatment of plants, sown at various dates, with light-periods of 8, 10, 11, 12, 14 and 16 hr. per 24 hr. day (where 8 and 10 hr. light-periods were used, a comparison was made between the effects of curtailing the natural day in the morning and in the evening), (b) treatments, lasting 7, 14, 21, 30 and 60 days from the beginning of plant growth (5 days after sowing) with daily light-periods of 8, 10 and 14 hr., (c) treatments of plants 30, 60 and 90 days old with light-periods of 10 hr. daily. *C. olitorius* was more sensitive to photoperiodic variation than *C. capsularis*. Both species behaved as short-day plants ; the 10 hr. light-period, followed by 14 hr. darkness, inducing the earliest flowering in both cases. When subjected to a 10 hr. daily light-period *C. olitorius* flowered in 21 days as against 125.7 days in natural light and *C. capsularis* in 33.59 days as against 130.92 days in natural light. Earliness in flowering was also observed when daily light-periods of 8, 11 and 12 hr. were used. Plants grew better and flowered earlier when the 10 hr. light-period was applied by curtailing evening light than when the same light-period was applied by curtailing morning light. Flowering time where short light-period treatments were used was delayed by lateness of sowing in both species, but with long light-period treatments (more than 12 hr. light per 24 hr. day) flowering time was delayed by earliness of sowing. The interrelation between time of sowing and photoperiodic treatment is discussed with reference to temperature and rainfall. Plants treated with long light-periods of 14 and 16 hr. daily flowered very late, or not at all, and usually failed to fruit satisfactorily. It was found possible [treatment (b)] to induce very early flowering in *C. olitorius* and *C. capsularis* by subjecting them to daily light-periods of 10 hr. for 14 and 21 days, respectively. When the plants were subjected to light-periods of 10 hr. daily after 30 days of natural growth [treatment (c)] *C. olitorius* and *C. capsularis* were forced to flower within 54 days and 82 days, respectively, from the start of growth. Even when the treatment was first applied after 90 days of natural plant growth both species flowered earlier than when exposed to natural light throughout their lives. Details of the vegetative growth of the jute plants throughout the experiment are tabulated. Where plants were induced to flower early by being subjected to short, daily light-periods their daily increase in height was higher after than before flowering. In both species the initiation of fruiting was influenced by the temperature and length of daily photoperiod in the same way as the initiation of flowering.—W.J.B.

OTHER

1085 Staub, S. and Limfat, E. **Kenaf in Mauritius.** *World Crops* 1953, **5,** No. 2, 51-3, illus.

Hibiscus cannabinus was recently introduced into Mauritius and planted experimentally in the course of attempts to overcome the shortage of jute from India for sugar bags. Its advantages over the local "aloe," *Furcraea gigantea*, are that it is ready for harvesting 130-150 days after planting (compared with 3 years in the case of "aloe") and that it produces a longer, softer fibre. Not being exacting in its environmental requirements it was tested in a very dry area unsuitable for sugar.

ving took place in early December in rows 18 l 36 in. apart with 15-20 plants per foot in the vs, 500 lb. of 4-8-12 fertilizer per acre being plied. A severe drought shortly after germina- n resulted in 50% mortality, but the remaining nts reached a height of 4-5 feet 2 months after rains began. Flowering started in late March l maturation of the lower seed capsules (the imum time for harvesting) took place 5-6 weeks er when the plants were 7-12 feet tall with a m diameter of 0.5-1 in. The plots with 36 in. ween rows yielded 10% less than those spaced 18 in. The average yield was 10 tons green plant acre. Retting yielded 4 kg. dry, clean fibre per) kg. green stalks, which is only about half that orted elsewhere.—W.J.B.

6 SEALE, C. C. and others. **The experimental culture of kenaf, *Hibiscus cannabinus* L., for fiber and seed in South Florida.** *Turrialba* 1952, **2,** No. 3, 99-105, bibl. 34, illus. [Florida Everglades Agric. Exp. Sta.]

the experimental culture on peat soil at the rida Everglades Experiment Station in 1948-50 varieties and strains of kenaf from El Salvador, u, India, Java, Turkey and E. Asia, 5 El vador strains gave higher yields than the com- rcial El Salvador type grown in Florida and a (5.03, 4.98, 4.72, 4.59 and 4.5 lb. dry, retted e per 100 stalks compared with 4.04 lb. in the nmercial). On peat and sandy soils, vegetative wth, fibre content and seed development of the nmercial type were strongly influenced by the e of sowing. On peat soil, May/June sowings e maximum fibre yields. On sandy soils August/ tember sowings gave the best yields of seed. an NPK factorial experiment on fine sand, en-stalk and fibre yields were significantly increased by N, NP and NK, but not by P or K, le NPK gave the highest yield, about 1 ton per of dry, retted fibre.—W.J.B.

7 JUILLET, A. Étude de la germination d'*Urena lobata*. [**A study on the germination of *Urena lobata*.**] *Agron. trop.* 1952, **7,** No. 5, 487-507, bibl. 14, illus. [Sta. Rech. Charanconne, Soc. Procida, Beaucaire, France]

rmation is given on the systematics and the graphical distribution of *Urena* species, and on the varieties and vernacular names of *U. lobata*. The name Paka, which originated in Madagascar, is the most widely employed and indicates the plant as well as its fibre. An anatomical description of the pericarp and the seed of *U. lobata* is given. The possibility of improving the germination capacity of the seed by various treatments was studied. The results showed that germination capacity is considerably improved by treatment with sulphuric acid, followed by fungicidal treatment with Mercoran and Gammoran. The technique employed consisted in soaking the seeds (achenes) in concentrated sulphuric acid for 3 to 4 hr. and then washing them in tap water. The germination capacity of the treated seeds in the germinator was as high as 80-86% in 2 or 3 days, as against 3-5%in 8 days with the untreated achenes. The germination capacity of the treated seed in the soil was slightly lower than in the germinator but was about double that obtained from mechanically decorticated achenes.—E.B.O.

1088 GARBER, K. Über Anbau und Verwertung einiger *Asclepias*- und *Apocynum*-Arten. [**The cultivation and value of some species of *Asclepias* and *Apocynum*.**] *Z Acker- u. Pflbau* 1950, **92,** No. 1, 71-99, bibl. 36, illus. [Received 1952] [Staatsinst. angew. Bot., Hamburg]

An account is given of several years' experiments made by the Institute of Applied Botany, Hamburg, in the growing of different spp. of *Asclepias* and *Apocynum* as fibre plants. Results of these and other experiments are summarized. The stems of these latex-bearing plants contain 9-17% cotton-like bast fibres. The single fibres, which are united in bundles, are 30 to 50 mm. long and 0.012 to 0.03 mm. broad. They can be spun without any special difficulty. Yields vary from 40 to 65 dz. water-free stems per hectare, i.e., approximately 400 to 800 kg. fibre per ha. The whitish-yellow hairs found on the seeds of *Asclepias* cannot be spun, and, because of their brittleness, they are probably unsuitable for upholstery. The seeds contain an oil (12-20%) which is edible, but the quantity obtainable is very small because of the low seed yield. Some 2-3% pure rubber can be isolated from dry *Asclepias* leaves and stems.—G.M.R.

LAND USE, SURVEYS AND MANAGEMENT

)† WEATHERHEAD, T. D. **Aerial survey and agricultural development.** *Emp. Cott. Gr. Rev.* 1953, **30,** No. 2, 110-16, illus.

use of aerial photography in preparing vege- on maps of areas under consideration for de- pment provides a means, in certain instances, of linking ecology with soil evaluation. Aerial photographs can also give an overall picture of soil erosion in countries like Ceylon and Cyprus.—M.A.

1090† CRESSEY, G. B. **Land for 2.4 billion neighbors.** *Econ. Geogr.* 1953, **29,** No. 1, 1-9.

An account is given of various estimates that have been made of the different types of land use in the world, the potential area of undeveloped land, potential food production and other factors, which are reviewed in the light of the present and future pressure of world population on food resources. —P.J.B.

1091 Steden, A. and Schmittner, F. Die Produktionsgebiete Österreichs. [**The productive regions of Austria.**] *Bodenkultur* 1951, **5,** No. 4, 397-416, map. [Hochsch. Bodenkult., Vienna]

A geographical study, showing the distribution of crops.—G.M.R.

1092† Hilton, N. **The Land's End peninsula; The influence of history on agriculture.** *Geogr. J.* 1953, **119,** Pt. 1, 57-72, bibl. 33, illus.

1093† Nicholson, H. H. and Firth, D. H. **The effect of ground-water level on the performance and yield of some common crops.** *J. agric. Sci.* 1953, **43,** No. 1, 95-104, bibl. 9, illus. [Sch. Agric., Univ. Cambridge]

[See also *Herb. Abstr.* 22 : 384.] Preliminary observations are reported on the effect of static ground-water levels in Fen peat soils on the yields and growth of a series of crops grown in rotation during the period 1946-51. The seasonal incidence of rainfall had an important effect on the reaction of the crops to ground-water conditions. Results showed that : high ground-water levels of 20 in. in a dry growing season such as 1949, benefited spring-sown potatoes, kale and sugar-beet ; in wet growing seasons (1950, 51) there was little evidence of benefit from high ground-water level ; water levels above 20 in. in wet growing seasons caused the failure of sugar-beet and kale and depressed the yield of potatoes ; potatoes benefited consistently from moist soil conditions, the optimum ground-water level being from 16-20 in. according to season ; in years with wet summers, low ground-water levels (30-36 in.) benefited cereals, short grass leys, kale and sugar-beet. It was found that the effects of ground-water level operated either directly on the growth and development of the crop or influenced it indirectly through factors such as weed infestation, difficulties of cultivation or the incidence of disease.—K.L.

1094† Baird, J. C. **Crop husbandry in Northern Ireland.** *Brit. agric. Bull.* 1953, **5,** No. 23, 276-9, illus. [Rep. paper read at Brit. Ass. Ann. Meet. 1952.]

After discussing the climate, soils, land tenure and the use of fertilizers in N. Ireland, an account is given of the main cash and fodder crops of the present day. Oats for grain and fodder are the main cereals, and potatoes the main root crops grown; the total acreages amounting to 320,000 and 140,000 ac., respectively. Flax—the traditional crop of N. Ireland—is grown on about 25,000 ac. while about 75,000 ac. of perennial and Italian ryegrass are harvested annually for seed. By far the most important crop in the country is grass for pasture.—K.L.

1095† Cromie, A. **Practical difficulties encountered by the small farmer in Northern Ireland.** *Brit. agric. Bull.* 1953, **5,** No. 23, 289-91, illus. [Rep. paper read at Brit. Ass. Ann. Meet. 1952.]

1096† Merendi, A. Il Tavoliere di Puglia. [**The Tavoliere di Puglia.**] *Ital. agric.* 1953, **90,** No. 1, 45-58, illus.

An account is given of the land reclamation which is being carried out in the Tavoliere di Puglia, Italy.—E.B.O.

1097 Repp, Gertraud. Kulturpflanze in der Salzsteppe. Experimentell ökologische Untersuchungen zur Salzresistenz verschiedener Nutzpflanzen. [**Cultivated plants in the salt steppe. Experimental ecological studies on the resistance to salt of different crop and herbage plants.**] *Bodenkultur* 1951, **5,** No. 2, 249-94, bibl. 35, illus.

A study was made of the behaviour of certain crop and herbage plants in the Hungarian salt steppe known as the Pussta, where, in addition to a dry steppe climate, there are heavy, clayey, salt and soda soils which through excessive drainage have a very low water-table, sometimes as much as 3.5 m. deep. Two years' observations were concerned with : the limits within which plants can exist there ; the conditions under which yield depression ensues ; the root systems and water relations of the plants and adaptation to dry conditions ; salt absorption and osmotic values. Among the plants studied were *Glycine soja*, *Pisum sativum*, *Lupinus albus*, *Brassica napus*, *Zea mays* and *Oryza sativa*. These spp., with a few additional ones, are finally classified under the heads (1) very salt-resistant, capable of growing even in clayey, rather wet soils with a high salt content ; (2) suitable for clayey soils with moderate salt content or with deeper situated salt strata ; and (3) unsuitable for clayey salt soils, or at the most for soil improvement only.—G.M.R.

1098† Abramov, Ju. [**Development of suburban collective farms near Rostov-on-Don.**] [Russian] *Soc. seljs. Hoz.* (*Social. Agric.*) 1952, **23,** No. 10, 38-45.

The work contains tabulated data on the percentages (of total sowings in the Province) allocated to grain, potatoes, herbage plants and other crops, for the years 1941 and 1950. There is also informan on the crop rotations (with and without igation) practised on the Molotov Collective rm, Bataĭsk district.—M.H.

99† Kljuškin, E. A. [**A scientific research station in the desert.**] [Russian] *Priroda, Moskva* (*Nature, Moscow*) 1953, **42,** No. 1, 70-3, illus. [Repetek Desert Res. Sta., Turkmenia]

e Turkmenian Academy of Sciences controls the petek Desert Research Station which is located the south-east of the Kara-Kum. It is claimed at the Station was the first of its type in the rld, being established by the Russian Geo-aphical Society in 1912. An account is given of e Station's history, and of the vegetation of this sert region where there is an extreme continental mate ; the maximum precipitation is 100 mm. a. (December-April), and the air temperature ctuates between 46° and —27°C. The sand-rface temperature attains 70-80°C. Research ojects include study of the vegetation of the gion, sand stabilization and general problems desert reclamation.—M.H.

00† Avdonin, N. [**Measures to increase yields of crops in the non-chernozem belt.**] [Russian] *Soc. seljs. Hoz.* (*Social. Agric.*) 1953, **24,** No. 2, 18-26.

e problems involved in improving the agricul-ral industry in the non-black-earth belt of the ropean SSR are reviewed, with special regard crop rotations, winterhardiness of crops, the ed for fertilizers and the sowing of certain crops effect soil improvement.—M.H.

01 Roy, M. Les terres inondées de la vallée sahélienne du Niger. [**The flooded lands of the Sahel valley of the Niger (French Sudan).**] *Agron. trop., Nogent* 1952, **7,** No. 6, 619-22, map.

is is a study of the agricultural potentialities l the improvement of this region, where rice *yza glaberrima*) and sorghum (mainly *Sorghum uum* var. *confusum*) are almost the only crops wn.—E.B.O.

1102† Walter, M. W. **A new presentation of the seasonal rainfall of East Africa.** *E. Afr. agric. J.* 1952, **18,** No. 1, 11-20, illus. [E. Afr. Met. Dep.]

1103† Chapman, L. J. **The climate of northern Ontario.** *Canad. J. agric. Sci.* 1952, **33,** No. 1, 41-73, bibl. 10, illus. [Ontario Res. Found., Toronto]

The area in question is divided into 8 regions, for each of which detailed climatic data are given, with particular reference to their agricultural significance. A note is given on climatic analogues between northern Ontario and other parts of the world.—P.J.B.

1104 Farnworth, Constance A. **The agriculture of Uruguay.** *Foreign Agric. Bull.* 3. *U.S. Dep. Agric.* 1952, pp. 133, bibl. 34, illus.

A review is given of a wide range of aspects of Uruguayan agriculture, with particular reference to economic factors. Statistical data are given of the area, production and yield of the principal crops grown.—P.J.B.

1105† Hegarty, A. **Agriculture in the Mary Valley and adjoining districts** [**Queensland**]. *Qd agric. J.* 1952, **75,** Pt. 6, 311-32, illus.

A description of this important beef and dairying area is given. Anti-erosion and grassland improvement measures are described.—M.A.

1106 Boas, F. Versuche zur Ackerflora. [**Research on the flora of arable land.**] *Landw. Jahrb. Bayern* 1952, **29,** No. 7-8, 367-448, bibl. in text, illus. [Munich]

A detailed sociological study of the natural flora of arable land in Germany is presented, based on some 24 surveys made by the author. Approximately 200 plant spp. comprise this flora [the term " weed " is avoided]. The associations and communities concerned are sociologically grouped (p. 374), and the significance of the leading plants as indicators of ecological conditions is examined. —G.M.R.

FARMING SYSTEMS AND PRACTICES

17 Lantbruksakademiens Kommitté för Ekonomisk Forskning. Lönsamheten vid jordbruksdrift med kreatursskötsel och utan sådan. Undersökningar av en serie medelstora jordbruk i mellersta Sverige under åren 1947-1949. [**Profitability of farms with and without cattle. Investigations of a series of medium-sized farms in middle Sweden during 1947-1949.**] *K. LantbrAkad. Tidskr.* 1952, **91,** No. 6, 400-66, bibl. 46, English summary pp. 462-5.

The paper is divided into 3 sections. The first deals with the methods of costing used, which are based on modern cost-accounting, the second with the profitability of farms with and without cattle and the third with detailed analyses of income and costs on the farms studied.—P.J.B.

1108† Vlasjuk, P. A. [**The nutrition regime of crops in a ley system of farming.**] [Russian] *Izv. Akad. Nauk SSSR. Ser. Biol.* (*Bull. Acad. Sci. USSR. Ser. Biol.*) 1952, No. 2, 86-110, bibl. 29. [Inst. Pl. Physiol. Agric. Chem., Acad. Sci. Ukraine SSR]

1109† Fokeev, P. M. [**Grain crops under irrigation.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, **20,** No. 1, 57-69. [Inst. Agric. S.-E. USSR, Voronež]

The development of agriculture in the arid and semi-arid regions of USSR is discussed with special regard to the following aspects : the introduction of a ley rotation in irrigation farming ; soil cultivation and irrigation ; fertilizers for grain crops under irrigation ; the irrigation regime for grain crops ; general problems of growing grain crops under irrigation ; control of lodging in wheat under irrigation ; and suitable wheat varieties for irrigated areas.—M.H.

1110† Kuvšinov, I. [**Problems of irrigation farming in the 5th 5-Year Plan.**] [Russian] *Soc. seljs. Hoz.* (*Social Agric.*) 1952, **23,** No. 12, 3-12, bibl. in text.

1111† Robertson, D. W. **Irrigated agriculture.** *Agron. J.* 1952, **44,** No. 12, 597-602, bibl. 12. [Colorado A. and M. Coll., Fort Collins]

The question of increasing the acreage under irrigation in the USA is viewed in the light of the rising pressure of population on food resources. Among topics discussed are : watershed management, measurement of water flow and the requirements of crops for water, methods of applying irrigation water and the problem of salinity. These topics are discussed mainly in relation to the semi-arid areas of the western USA and the need for more research into irrigation problems and techniques is stressed.—P.J.B.

1112† Montanari, V. Irrigazione a pioggia e possibilità di ulteriori sviluppi. [**Sprinkler irrigation and possibilities of its further development (in Italy).**] *Agricoltura d. Venezie* 1953, **7,** No. 3, 111-33, bibl. 8.

1113 Candioli, P. Alcune notizie su un impianto di irrigazione a pioggia del Ravennate. [**Information on a sprinkler irrigation plant in Ravenna Province (Italy).**] *Agricoltura d. Venezie* 1953, **7,** No. 3, 141-8.

Of the 136 ha. of the farm in question, 66 ha. are sprinkler irrigated, the irrigated crops including sugar-beet, forage crops and maize.—E.B.O.

1114 Idnani, M. A. and Chibber, R. K. **Utilization of wild legumes for green manuring.** *Sci. and Cult.* **18,** No. 8, 362-4, bibl. 5. [Indian Agric. Res. Inst.]

Increased yields obtained by growing green-manure crops in India range from 68-333 lb. per ac. for wheat and 350-444 lb. per ac. for rice. The writers maintain that the increased yields are insufficient to compensate for the loss of a cropping season involved and bring evidence from literature to show that under Indian conditions green manures make a negligible contribution to the improvement of the physical properties of the soil. Since the chief benefit derived from green manure crops in India is the improvement of the N status of the soil it is suggested that the utilization, as manure, of the leafy parts of wild leguminous plants should replace, where possible, the practice of growing crops for green manure. The N, P_2O_5, K_2O and CaO contents of the leaves of 38 wild legumes are tabulated. The N contents of the leaves of different wild legumes vary from 2 to 6% of the dry matter. Experiments were carried out in which the nitrification in the soil of the leaves of 9 wild legumes was measured over a period of 20 weeks. Leaves containing over 2.6% total N released 42-54% of their N in available forms while those containing less than 2% yielded 22% of their N. Further tests were carried out on soil of low fertility, to determine the effect of burying the leaves as green manure on the yield of wheat grain and straw. The leaves of wild legumes, applied as green manures, at a rate equivalent to 50 lb. N per ac. gave yields of wheat grain somewhat higher than those obtained where berseem was used as a green manure at the same rate of N per ac. The wild legume leaves can be dried in the sun without loss of manurial value.—W.J.B.

1115† Scottish Agriculture. **Notes from Craibstone : cereal-legume mixture for silage.** *Scot. Agric.* 1952/53, **32,** No. 3, 166-8.

Trials during one year are reported on the inter-plant competition, yields of dry matter and crude protein at different stages of growth and the effect of N applications on yields, in mixed crops of oats vetch (*Vicia* sp.)/peas grown for silage. The oat used was a very leafy variety [name not stated], sown at rates of 120, 80 and 40 lb. per ac. With each different rate of oat sowing, the following vetch/pea mixtures were sown per ac : (a) 28 lb. vetch + 28 lb. peas, (b) 56 lb. vetch + 28 lb. peas, (c) 28 lb. vetch + 56 lb. peas. 15 lb. per ac. of Italian rye-grass (*Lolium multiflorum*) was under-sown on all plots. After seedling emergence, half of each seeds mixture was given 1.5 cwt. and the other half 3 cwt. of sulphate of ammonia per ac. The crop was cut at the following stages of development : (1) oats 2 ft. high, (2) when the oat ears had fully emerged, (3) top oats in the panicle at the milky stage, (4) oat crop ripe. In oats sown at 120 lb. per ac., the proportion of legumes in crops cut at stage (1) was 9.7% and at stage (4) 6.0% where 1.5 cwt. of N manure had been applied. Where 3 cwt. N manure ac. had been applied, the proportions of legumes the mixtures cut at stages (1) and (4) were 15 4.5%. In oats sown at 40 lb. per ac., crops eiving 1.5 cwt. N manure per ac. and cut at ges (1) and (4) contained 20 and 40% legumes ; crops receiving 3 cwt. N manure per ac., re- ctive legume proportions were 7 and 14%. Thus, y at the low sowing rate of oats and where the s matured, did the legumes make a significant tribution to the yields. Peas appeared to be less rant of competition than vetches. The highest lds were obtained from oats sown at 40 lb. per , receiving 3 cwt. of N manure per ac. and cut at ge (4). Dry matter yields following this treat- nt were 88 cwt. per ac., crude-protein yields e 6 cwt. and crude-fibre yields 14.7 cwt. per ac.; ps similarly treated, but cut at stage (1) yielded cwt. per ac. of dry matter and 6.9 cwt. per ac. of de protein. Oats sown at 120 lb. per ac., receiving 3 cwt. N manure per ac. and cut at stages (1) and (4) yielded 81 and 64 cwt. per ac. of dry matter and 8.1 and 4.1 cwt. per ac. of crude protein, respectively. Oats sown at 120 lb. per ac., receiving 1.5 cwt. N manure per ac. and cut at stages (1) and (4) yielded 70 and 78 cwt. per ac. dry matter and 5.4 and 5 cwt. per ac. crude protein, respectively. Oats sown at 40 lb. per ac., receiving 1.5 cwt. N manure per ac. and cut at stages (1) and (4) gave dry matter yields of 57 and 65 cwt. per ac. and crude protein yields of 4.7 and 5.9 cwt. per ac., respectively. From these results, it is concluded that legumes do not always contribute as much to the dry-matter and crude-protein yields of oat/legume mixtures as is often supposed and that a cheap and reliable way of producing high yields of protein may be the growing of thickly-sown oats, undersown with Italian ryegrass, for cutting at an early growth stage.—P.J.B.

SOIL AND WATER CONSERVATION

6† MARILLONNET, L. Problèmes de mise en valeur des polders aux Bays-Bas. 1. [**The problems of improving the polders in the Netherlands. 1.**] *Agron. trop., Nogent* 1953, **8**, No. 1, 5-71, illus., maps.

7† EKERN, P. C. **Problems of raindrop impact erosion.** *Agric. Engng, St. Joseph, Mich.* 1953, **34**, No. 1, 23-5, bibl. 17. [Wisconsin Univ., Madison]

problem of the additive effect of raindrop act on the process of sheet erosion is con- red.—P.J.B.

1118 WOODRUFF, N. P. and ZINGG, A. W. **Wind tunnel studies of shelterbelt models.** *J. For.* 1953, **51**, No. 3, 173-8, bibl. 5, illus. [Kansas Agric. Exp. Sta., Manhattan]

The results are given of wind-tunnel studies on the effectiveness of 5-, 7- and 10-row tree shelter-belts. Conventional 10-row shelter-belts offered the best wind protection, both at ground-level and at points above ground-level. 5-row shelter-belts, however, were almost as effective as those with 10 rows and were similar in effectiveness to 7-row shelter-belts. —P.J.B.

WEEDS AND WEED CONTROL

See also under individual crops

SENARATNA, J. E. ***Salvinia* in Ceylon.** *Trop. Agriculturist* 1952, **108**, No. 3, 194-5.

ccount is given of the appearance, distribution, agation, dispersal, economic significance and rol of the free-floating weed *Salvinia* (the r ferns *Salvinia auriculata* and *S. natans*) in on. *S. auriculata* is the most widespread of the species and has overrun numerous waterways e coastal areas. The vegetative reproduction of *riculata* is extremely rapid, since the numerous aches of the plant readily break away from the t and continue life as separate entities. Winds, , floods and animals all help in the dispersal of ative portions of the weed. *Salvinia* forms, on vater-surface, a dense carpet-like cover which es waterways and irrigation channels and is le of preventing the emergence of rice plants in the field. The complete destruction of the weed is often hindered by the presence on the banks of water-courses of overhanging bushes with which portions of the weed become entwined. Among the weed-killers tried, the hormone types appear to give the best control of *Salvinia*. Wherever possible the weed should be removed by hand. Bamboos laid across waterways can be used as barrages at which the *Salvinia* can be collected. It is suggested that the weed when collected could be used as organic manure.—W.J.B.

1120† EADIE, I. McL. **Control of stinkwort by hormone type weedicides.** *J. Aust. Inst. agric. Sci.* 1953, **19**, No. 1, 45-7, illus. [I.C.I., Melbourne]

A trial was made using the sodium salt and butyl ester of MCPA, the ethyl ester of 2,4-D, the butyl ester of 2,4,5-T and mixed butyl and ethyl esters of 2,4,5-T and 2,4-D applied as low-volume sprays to young stinkwort (*Inula graveolens*), a weed of pastures and arable lands, at 1 and 2 lb. of acid equivalent per acre with the addition of wetting agents. All treatments gave 99% kills.—M.A.

1121 LINDSAY, D. R. **Taxonomic investigations on wild oats.** *Proc. Joint 9th N. Cent. and 6th W. Canad. Weed Contr. Conf., 1952* 1952, 20-2. [Sci. Serv., Ottawa, Ontario]

From an examination of 450 specimens of wild oats from 5 experimental stations in western Canada, it was apparent that most plants were of the *Avena fatua* ssp. *fatua* group, and contained all 4 varieties of ssp. *fatua* described by Malzew, namely : *pilosissima*, *glabrata*, *intermedia* and *vilis*. The morphological differences of these varieties are noted. The variety *glabrata* was the least frequent of these subspecies. At certain stations, one given variety tended to predominate. Certain " off-type" plants were noted, which were considered to fit Malzew's description of ssp. *cultiformis*. The varieties *pilosissima* and *intermedia* bred fairly true to type, while *glabrata* and *vilis* were relatively much less fixed in type.—P.J.B.

1122 ORSENIGO, J. R. and SMITH, O. **The chemical control of northern nut grass, *Cyperus esculentus* L.** *Proc. 7th N.E. Weed Contr. Conf. 1953* 1953, 329-39, bibl. 4. [Veg. Crop Dep., Cornell Univ., Ithaca, N.Y.]

A report is given of the results of 3-years' work on the control of *C. esculentus*, a weed of increasing importance on arable land. To date, the most effective treatments have been : (a) CMU at 20, or more, lb. per ac., (b) General 7B-D (49.34% TCA, 7.06% pentachlorophenol, 2.83% 2,4-D) and General 7 (53.7% TCA, 46.23% oil), both at 15 gal. per ac. in 85 gal. water, (c) TCA at 75 lb. per ac., (d) TCA at 25 or 50 lb. per ac., plus 2,4-D at 15 lb. per ac., or plus dinitro materials at 9 lb. per ac., and (e) 2,4-D at 15 lb. per ac. in 5 gal. oil, as an emulsion made up to 100 gal. per ac. with water. TCA has proved the most reliable material so far tested when applied to *C. esculentus* at an early growth stage, before tuber formation. For partial control of *C. esculentus* in maize, pre-emergence treatments of the crop with 1 lb. per ac. of CMU before the emergence of the weed, is considered to be a reliable method for inhibiting its growth for up to 6 weeks and for reducing tuber formation.—P.J.B.

1123 UHL, H. Die Anwendung von Kalkstickstoff und Feinkainit gegen die Ackerunkräuter auf Kalkböden sowie Untersuchungen über deren Keimlinge und Keimungsbiologie. [**Application of calcium nitrate and fine kainit for the control of arable weeds on chalk soils and investigations into the biology of their seedlings.**] *Z. Acker- u. Pflbau* 1952 **95,** 121-58, bibl. 35, illus. [Stuttgart-Hohenheim]

The biology of the following seedlings was studied and described with reference to their susceptibility to applications of calcium nitrate and fine kainit :— *Adonis aestivalis*, *Caucalis lappula*, *Delphinium consolida*, *Galium tricorne*, *Melampyrum arvense*, *Neslia paniculata*, *Scandix pecten-veneris*. The effect of these chemicals both separately and in admixture on these and other weed species was observed. Calcium nitrate gave best herbicidal results when applied at the cotyledon stage as its action was effective against the root system. Fine kainit acted principally on the leaf system and the best time of application was the leaf rosette stage. The quicker-acting fine kainit was more effective than calcium nitrate when there was little rain.—M.A.

1124 JACOBSON, G. Trädesförsök. Resultat av bearbetningsförsök under åren 1936-1941 och 1942-1948. [**Fallow treatment trials during the years 1936-1941 and 1942-1948.**] *Medd. 38. Statens Jordbrförsök. Sweden* 1952 pp. 35, bibl. 8, English summary pp. 33-4

Studies are reported on the effect of different types of fallow in Sweden on the control of such weed species as *Agropyron repens*, *Sonchus arvensis* and *Tussilago farfara* and on the subsequent crop yields during an entire rotation. The different fallowing methods used were : (a) normal complete fallow, including either autumn or spring ploughing, followed by cultivation with harrows etc. up to the time of sowing autumn-sown cereals; (b) pig fallow, in which the procedure was as for (a), but the soil was not worked until the time of seed-bed preparation for autumn-sown cereals; (c) drill fallow, in which the procedure was as for (a), but the soil was laid up into ridges, which were split as often as necessary to obtain weed control; (d) bastard fallow in which the treatment was as for (a) up to late spring, when either a crop for green harvesting was sown and harvested in time for the autumn sowing of cereals, or an early crop of peas or potatoes was taken, the fallow period being during summer and early autumn. In all cases, the normal complete fallow and the drill fallow gave the best results in terms of weed control and subsequent crop yields. The yield of winter cereals following treatments (a) and (c) was considerably higher in all cases than those following the other fallow treatments ; also, the beneficial residual effects lasted longer and resulted in higher yields from the leys in the rotation. The spring-ploughed normal, complete fallow and drill fallow gave somewhat better weed control than where autumn ploughing was done. The pig fallow was the least effective of all in controlling weeds.—P.J.B.

25 Hoehener, H. Zwei Jahre praktische Erfahrungen in der Anwendung des Helikopters bei der chemischen Schädlingsbekämpfung in der Schweiz. [**Two years' experience of using the helicopter for the chemical control of weeds in Switzerland.**] *Schw. landw. Mh.* 1952, **30,** No. 5, 165-79, illus. [Maag's Chem. Works, Dielsdorf, Zürich]

Hiller 360 helicopter was used (1) for the control
Melolontha in woodland, and (2) to spray field
ps of potatoes and sugar-beet. In the first case
e highly concentrated application of Hexamul
s effective for 12 to 14 days, in spite of a con-
lerable amount of rainfall, and the Canton
thorities believe the use of a helicopter to supple-
nt other means of controlling *Melolontha* will be
lispensable in future. In potatoes, one treat-
nt with Dorytox was found enough to keep the
tato beetle completely in check, but the fungi-
al action of copper—as applied by helicopter—
ainst *Phytophthora infestans* in potatoes and
rcospora beticola in sugar-beet is not yet fully
ved. Results of the trials were, however, good,
d in the potatoes there was practically no leaf
. For successful treatment by helicopter a
ficiently large area, or not less than 50 to 100
tares, must be available, and the larger the area,
lower are the costs per unit area. Because of the
idity of the process, the cost of spraying by
icopter compares favourably with that of
rating motor-propelled or other sprayers. The
nning of flights with the aid of signallers is out-
ed.—G.M.R.

26 Eversen, L. E. and Dunham, R. S. **The effect of 2,4-dichlorophenoxyacetic acid on certain weeds and crop seeds.** *Tech. Bull. 197. Minn. Agric. Exp. Sta.* 1951, pp. 24, bibl. 35, illus. [Received 1953]

e germination of non-dormant crop and weed
ds was inhibited by soaking in concentrations of
) and 1000 ppm. triethanolamine salt of 2,4-D,
extent of inhibition increasing as the time of
osure increased from 2 to 16 hr. The effect of
2,4-D was least in the case of curly dock
mex cripus) and greatest in wheat, wild mus-
d (*Brassica kaber*) and pennycress (*Thlaspi
ense*) seeds. There was some tendency for the
licle growth of *B. kaber* and *T. arvense* to be
reased following soaking in 0.1 and 1 ppm.
ncentrations of 2,4-D for 2, 4 or 8 hr., compared
h controls. With the embryo-dormant seeds of
nsylvania smartweed (*Polygonum pennsyl-
icum*) and pale smartweed (*P. lapathifolium*),
king in 10,000 ppm. solutions of 2,4-D for 48 hr.
ulted in reductions in radicle growth, compared
h controls. Seed of giant ragweed (*Ambrosia
ida*), similarly treated, did not germinate at all.
permeable seed of butterprint (*Abutilon theophrasti*) soaked for 12 hr. in 10 and 1000 ppm. 2,4-D solutions, was significantly reduced in germination, compared with controls. Dry maize and wild mustard seeds were slightly injured by exposure to volatile 2,4-D, while moist seeds similarly exposed were unaffected. 2,4-D persisted in seed coats, or seeds, for up to 6 months where the seed was stored at 30°C. 2,4-D on, or in, the seed coats of impermeable seeds, was inactivated when the seeds were stored in warm, moist, peat soil.—P.J.B.

1127† Young, D. W. and Loomis, W. E. **Control of vegetation on roadbeds and similar areas.** *Proc. Joint 9th N. Cent. and 6th W. Canad. Weed Contr. Conf., 1952* 1952, 47-50. [Iowa Agric. Exp. Sta., Ames]

The results are given of 2-years' studies on the use of different herbicidal materials, including TCA, 2,4-D, sodium chlorate, sodium arsenite, CMU, Borasan (boron compound) and oils with different boiling points and aromatic oil contents, for controlling miscellaneous weeds on railroad tracks in the USA. Good control of *Agropyron repens*, *Bromus inermis* and other weeds has been obtained by the use of 40 lb. TCA + 80 lb. sodium chlorate per ac. Early spring treatments have given the best results. CMU has given good results in many tests, but is expensive and difficult to maintain in suspension form. Following TCA + sodium chlorate treatment, periodic follow-up treatment with 60 gal. per ac. of oil with a content of 50% aromatics and olefines, has given good control of re-invasion with annual broad-leaved and grassy weeds. For controlling horsetail (*Equisetum* sp.) and other resistant weeds, fortification of the oil treatment with 2 lb. per ac. of 2,4-D has proved effective where danger of drift to susceptible crops was not present. In Iowa conditions, TCA + sodium chlorate treatment in spring, followed by August treatment with oils has been the most effective first-year treatment. For eradicating Bermuda grass (*Cynodon dactylon*), 2 treatments with TCA may be required.—P.J.B.

1128 Suggitt, J. W. **Recent research in chemical brush control.** *Proc. Joint 9th N. Cent. and 6th W. Canad. Weed Contr. Conf., 1952* 1952, 59-63.

There are two sections to this paper. Section 1 deals with the effectiveness of foliage spraying of resistant woody plants in relation to growth stage, the effect of timing of spraying and the herbicidal concentration of 2,4,5-T. The trials reported were carried out near Toronto, a cold-temperate, deciduous region. Types of hardwood treated included ash, hickory, maple, basswood, hornbeam, hawthorn and oak. The results indicated that ammonium sulphamate (Ammate) was less selective to resistant species than 2,4-D + 2,4,5-T treatments. The best Ammate concentration was 0.75 lb. per gal. used as a non-selective foliage spray. For treatment of mixed susceptible and resistant species, the best 2,4-D + 2,4,5-T treatment was a concentration of 0.25 - 0.35% of mixed esters. The most effective time of treatment was at a period between 20 and 70 days after bud-break (June to 3rd week in July in Ontario). Excellent results were obtained with late season foliage sprays of Ammate. The highest stem mortality in resistant species followed treatment with a 0.3% foliage spray of 1 part of 2,4-D to 1 part 2,4,5-T ester. Section 2 of this paper deals with the effect of timing, herbicidal formulation, concentration and aromatic-oil content of the oil carrier of materials used for basal bark, dormant-season spray treatments for controlling woody species. 2,4,5-T ester in oil used as a dormant-season, basal bark spray was more effective than 2,4-D, or a mixture of 2,4-D + 2,4,5-T. The best time of treatment was between February and May. A concentration of 1.2 to 1.5% 2,4,5-T ester (acid equivalent) in an oil carrier gave the best results. Carrier oils with a content of between nil and 30% aromatic oils were more effective than oils with a higher aromatic oil content ; diesel oil and No. 2. fuel oils were both satisfactory. High-volume oil treatments (60 gal. per ac.) were more effective than low-volume (20 gal. per ac.) treatments : dormant-season, basal bark treatments were more effective than foliar sprays. Basswood (*Tilia americana*) was the most difficult species to control with 2,4,5-T.—P.J.B.

1129† SCHMIDT, H. Zur Entwicklung der chemischen Unkrautbekämpfungsmittel. [**Development of chemical weedkillers.**] *NachrBl. dtsch. PflSchDienst, Berl.* 1952, **10,** 187-96, bibl. 55, illus.

The use and composition of different chemical weedkillers and their effects on certain weed types are discussed.—M.A.

1130 SCRAGG, E. B. **Selective weedkillers: recent developments.** *Scot. Agric.* 1952-3, **32,** No. 3, 124-31, bibl. 6.

A review is given of the relative merits of different herbicides. In trials in Scotland on the control of day-nettle (*Galeopsis tetrahit*) in barley crops, MCPA proved very effective, while 2,4-D ester, Na and amine formulations gave poor control. In trials on the effect of herbicides on legumes undersown in oat crops using MCPA 2,4-D amine, ester and Na formulations and Agroxone dust (MCPA formulation), only red clover (*Trifolium pratensis*) was resistant enough to the herbicides to tolerate such treatment and only MCPA at the minimum effective rate of application was suited for this use. Recommendations are given for the use of DNBP (2-(1-methyl-n-propyl)-4 : 6-dinitrophenol) for controlling weeds in pea and bean crops. The recommended rate of treatment is 1 to 2 lb. per ac. of the ammonium salt in 80 to 100 gal. per ac. spray volume. It is stated that treatment is useless where temperatures are below 55°F. Peas must not be under 4 in. and not over 10 in. high when sprayed. Beans may only be sprayed before they are 4 in. high and only when making slow growth. Reduced rates of treatment must be used where temperatures are above 65°F. Notes are given on 2,4,5-T, IPC and TCA.—P.J.B.

1131 BLACKMAN, G. E. **The principles of selective toxicity and the action of selective herbicides.** *Sci. Progr., Lond.* 1950, **38,** No. 152, 637-51, bibl. 53. [Received 1952] [Dep. Agric., Univ. Oxford]

This is a review of the work associated with selective herbicides since 1934 and is dealt with under the heads : retention, penetration, and transport (of herbicides by the plant), toxicity at cell level, the biological responses of resistant and susceptible plants and the mode of action of growth-regulating substances. [See also *Herb. Abstr.* 21 : 865 and *Fld Crop Abstr.* 5 : 1311.]—K.L.

1132 RIPPER, W. E. and BAKER, C. **The relative toxicity of 2 : 4-dichlorophenoxyacetic acid and 2-methyl-4-chlorophenoxyacetic acid to annual weeds.** *J. Sci. Fd Agric.* 1952, **3,** No. 12, 561-7, bibl. 8, illus. [Pest Contr. Ltd., Cambridge]

The apparent toxicity ratio of the sodium salts of these two herbicides is shown to vary with the interval after spraying at which observations are made, the dosage applied, the incidence of rain after spraying and the particular salt used. Spray droplets of sodium 2,4-D dry out relatively completely, leaving a crystalline deposit, whereas those of sodium MCPA tend to dry to a non-crystalline film. It is suggested that the observed variation in relative toxicity may be due to differences between the two materials in the facility with which they enter the leaf ; sodium MCPA penetrates the more readily owing to the non-crystalline nature of the spray deposit, and thus gives better results when rain follows after an interval which much decreases the efficacy of sodium 2,4-D.—From authors' summary.

1133 ANDERSON, W. P. and others. **Evaporation of some plant growth regulators and its possible effect on their activity.** *Science* 1952, **116,** No. 3019, 502-3, bibl. 5. [Pl. Industr. Bur., U.S. Dep. Agric., Beltsville, Md]

The results are given of studies on the rate of evaporation at different temperatures of a number of plant growth regulators. 2,4-D ethyl ester, IPC and Cl IPC had relatively high rates of evaporation when spread thinly over large areas. Samples of IPC stored for 2 weeks at temperatures of 60, 70 and 85°F. lost 2, 21 and 25% of their original weight. 2,4-D acid, α-naphthalene acetic acid and

ydroxy-5-isopropyl-2-methylphenyl) trimethyl
monium chloride 1-piperidinecarboxylate did
evaporate appreciably under normal tempera-
e ranges. It was concluded that some car-
nates, such as IPC and ClIPC, may evaporate
idly from plant surfaces at temperatures of 70
35°F. and may be reduced in effectiveness when
d as herbicides at these temperatures.—P.J.B.

4 LINSER, H. Unkrautbekämpfung auf hormonaler Basis. [**The control of weeds by means of hormone preparations.**] *Bodenkultur* 1951, **5,** No. 2, 191-222, bibl. 86, illus. [Austrian Nitrogen Works Ltd., Linz]

e subject is reviewed on the basis of its literature.
.M.R.

5† HAMMER, O. **Hormone weed-killers and bees.** *Research, Lond.* 1953, **6,** No. 4, 151-3, illus. [Danish Bee Res. Inst., Hillerod]

e danger to seed production resulting from the
ge-scale use of hormone weedkillers and con-
uent reduction of the bee population is stressed.
intensive propaganda campaign has been
ried out recently in Denmark to discourage
aying of flowering plants, both wild and culti-
ed.—M.A.

1136† UJVÁROSI, M. Die Unkrautarten der ungarischen Ackerböden und ihre Lebensformanalyse. [**The weed species of Hungarian arable land and analysis of their life forms.**] *Acta Agron. Acad. Sci. Hung.* 1952, **2,** Nos. 3/4, 237-74, bibl. 30, illus., English and Russian summaries pp. 271-4.

The author's work on a sociological survey of weeds in Hungary has been in progress since 1947. The life-form distribution of each weed is based on a life-form system which, in contrast to that of Raunkiaer, includes tillage operations, as well as temperature and moisture as ecological factors.—M.H.

1137 UJVÁROSI, M. Experimente auf Äckern zur Untersuchung der unkrautbekämpfenden Wirkung der verschiedenen Getreidesaaten. **Experiments on tilled land for the investigation of the weed-killing effect of various grain crops.** *Acta Agron. Acad. Sci. Hung.* 1952, **2,** No. 2, 149-207, bibl. 12, illus., Russian and English summaries pp. 203-7. [Agric. Res. Inst., Debreczen]

The author's work on plant sociology was designed to investigate laws which determine the mutual relationship between cultivated plants and weed populations. The problem of perennial weeds is not considered in this work.—M.H.

CROP BOTANY

8† MALYŠEV, A. A. [**Thermoperiodism and its significance in plant development.**] [Russian] *Bot. Ž. SSSR* (*Bot. J. USSR*) 1952, **37,** No 2, 139-57, bibl. 48.

literature on phasic development is reviewed
he light of the author's studies on plants grown
igh altitudes, notably in the Pamirs and the
ntains of northern Caucasus. There has been
flicting evidence regarding the effect of altitude
plant development. Tabulated data are given
(1) differences in time required to pass the
ng or flowering phase of growth at 470 m. and
) m. a.s.l. exhibited by wheat, barley, potatoes,
millet ; (2) duration of developmental phases
ending on temperatures when plants (hemp,
ey, peas, flax) are grown under constant day
th (in controlled laboratory conditions). The
are claimed to support the conclusion that the
rent nature of plants can be altered by changes
nvironment.—M.H.

MAKSIMOV, N. A. [**Soviet plant physiology in relation to problems of irrigating agricultural crops.**] [Russian] *Bot. Ž. SSSR* (*Bot. J. USSR*) 1952, **37,** No. 1, 5-18, bibl. 36. [Inst. Pl. Physiol., USSR Acad. Sci., Moscow]

Research in plant physiology during the last 20 years is reviewed in the light of irrigation problems which have arisen out of the schemes for the agricultural development of the arid south-east of European SSR and of Soviet Central Asia.—M.H.

1140† DE, H. N. and DATTA, S. C. **Studies on the mechanism of biosynthesis of nicotinic acid during germination of cereals and pulses,** *Indian J. agric. Sci.* 1951, **21,** No. 4, 375-94, bibl. 39, illus. [Biochem. and Nutr. Labs. Dacca Univ., Pakistan]

A study was made of the biosynthesis of nicotinic acid in the germinating seed of mung (*Phaseolus radiatus*), kalai (*Ph. mungo*), Bengal gram (*Cicer arietinum*), cowpea (*Vigna catjang*), pea (*Pisum sativum*), rice and wheat. The nicotinic acid content of each type of seed reached a peak followed by a sharp decline at a certain stage of germination. Light did not appear to influence the process of biosynthesis. The greater portion of the nicotinic acid was found in the cotyledons in the early stages and in the embryo in the later stages of germination. Nicotinic acid synthesis in seeds and seedlings of *Ph. radiatus* was accelerated by the addition of ammonium sulphate or potassium nitrate to the medium but not by the addition of urea. Among the amino-acids, 1-arginine and 1-tryptophane were effective and 1-proline and d-arginine ineffective as stimulants of the process of nicotinic acid biosynthesis in germinated seedlings. Among B-vitamins, thiamine, riboflavin and pantothenic acid stimulated the biosynthetic process while pyridoxine was without effect. Salts of iron, copper and manganese, when added to the medium also increased the nicotinic acid content of germinating seeds. It is considered that an SH group is present in the enzyme system responsible for the utilization of the nicotinic acid by the plant since the addition to the medium of potassium arsenite (an agent capable of immobilizing an SH group) increased the store of nicotinic acid in seedlings. When cysteine and glutathione (themselves containing SH groups capable of interaction with potassium arsenite) were added with potassium arsenite to the medium, the storage of nicotinic acid in the seedlings was less than when the arsenite alone was added.—W.J.B.

1141 De, H. N. and Datta, S. C. **Effect of colchicine on the synthesis of nicotinic acid in germinating seeds.** *Indian J. agric. Sci.* 1951, **21,** No. 4, 395-400, bibl. 18, illus. [Biochem. and Nutr. Labs. Dacca Univ. Pakistan]

The effect of colchicine treatments (used for the induction of polyploidy) on the biosynthesis of nicotinic acid during germination of mung (*Phaseolus radiatus*) and pea was studied. The content of nicotinic acid in colchicine-treated seeds was lower than that in untreated seeds, the difference being more marked when the seeds were germinated in agar-agar containing ammonium sulphate than when germination took place in distilled water. In the case of seed not treated with colchicine the nicotinic acid content rose steadily during germination to a peak level [see Abs. 1140] while the nicotinic acid content of colchicine-treated seed fell suddenly after 24 hours of germination and afterwards rose in the normal way to a peak which was lower than the peak level for untreated seed. The authors consider that colchicine depresses the biosynthesis of nicotinic acid and that the utilization of the nicotinic acid is accelerated by the metabolic changes consequent upon the induction of polyploidy by colchicine.—W.J.B.

1142 Halden, W. and others. Veränderungen des Aneurin-, Phytinsäure- und Phosphatidgehaltes bei der Keimung von Gramineensamen. [**Changes in the aneurin, phytine acid and phosphatide content during the germination of seeds of the Gramineae.**] *Bodenkultur* 1951, **5,** No. 4, 437-48, bibl. 33. [Univ. Graz]

1143 Bentley, J. A. and Housley, S. **Studies on plant growth hormones. I. Biological activities of 3-indolylacetaldehyde and 3-indolylacetonitrile.** *J. exp. Bot.* 1952, **3,** No. 9, 393-405, illus. [Dep. Bot., Univ. Manchester]

Two neutral plant hormones, one isolated recently from plants (3-indolylacetonitrile) and the other (3-indolylacetaldehyde) reported to be present in plants, are available as pure synthetic compounds for investigation of their biological activities. This paper is mainly concerned with their effects on cell elongation in the *Avena* coleoptile.—From authors' summary.

1144 Bentley, J. A. and Bickle, A. S. **Studies on plant growth hormones. 2. Further biological properties of 3-indolylacetonitrile.** *J. exp. Bot.* 1952, **3,** No. 9, 406-23, illus. [Dep. Bot., Univ. Manchester]

3-indolylacetonitrile is more active than 3-indolylacetic acid in the *Avena* straight-growth test, but less active in the *Avena* curvature test at comparable concentrations. Reasons for this are discussed and results of previous work on plant extracts, using the curvature test as a means of assay, are considered.—From authors' summary.

1145† Epstein, E. **Mechanism of ion absorption by roots.** *Nature, Lond.* 1953, **171,** No. 4341, 83-4, bibl. 7, illus. [U.S. Dep. Agric., Beltsville, Md]

The mechanism for the absorption of alkali cations outlined in *Pl. Physiol.* 1952, 27, p. 457 has been shown to apply also to the absorption of anions by barley roots. There is discussion of the data in the light of the work by Lundegårdh, *Nature, Lond.* 1946, 157, p. 575.—M.H.

1146 McCollam, M. E. **The leaf analysis approach to crop nutrition.** *Bett. Crops* 1952, **36,** No. 10, 6-14 and 43, illus.

Notes are given on the value of foliar analysis for determining nutrient deficiencies in a range of crops. Recommendations are given for barley, sugar-beet, pea and potato plants in respect of which part of the plant to use for foliar analysis, and when to take the sample. The critical ranges of N, P and K content in plant samples are given. —P.J.B.

1147 Johnson, C. M. and others. **Molybdenum nutrition of crop plants. 2. Plant and soil factors concerned with molybdenum deficiencies in crop plants.** *Pl. and Soil* 1952, **4,** No. 2, 178-96, bibl. 17. [California Univ. Agric. Exp. Sta., Berkley]

Studies were made of the growth of a large number of crop species, sown in autumn and spring in pots containing a soil of serpentine origin, known to cause Mo deficiency symptoms in lettuce and tomato plants. The soil was adequately supplied th Ca, N, P, S and K. None of the legume species, cluding *Pisum sativum*, nor the cereal species, cluding barley, maize, oats, sorghum, or wheat, owed symptoms of Mo deficiency. The addition 1 ppm. Mo (on a dry soil basis) did not increase e growth of these species. The remaining crop ecies, including sugar-beet, buckwheat, potatoes, rnips, mustard and other *Brassica* species, all owed symptoms of Mo deficiency. The non-pearance of Mo deficiency symptoms in the gume and cereal species was not due to their itial supply of seed-borne Mo. Certain species of gumes, maize and sorghum appeared to be more icient in extracting Mo from the soil than the her crop species. Healthy barley, maize, oat and heat plants contained as little as 0.03 to 0.07 ppm. o, while sugar-beet and buckwheat plants conined as much as 0.11 to 0.13 ppm. Mo although ll showing Mo-deficiency symptoms. Where pplements of 1 ppm. Mo were made to the crop owing Mo-deficiency symptoms, the foliar sympms disappeared, growth increased and the nitrate-content of the leaves decreased. Leaf chlorosis s the most general foliar symptom of Mo deiency.—P.J.B.

48† HAASJES, K. H. S. and SISSINGH, H. A. **An experiment for determining the depth of penetration of various phosphates with the aid of P^{32}.** *Neth. J. agric. Sci.* 1953, **1,** No. 1, 15-26, illus.

addition to investigations into the depth of peneation of radioactive phosphates in the soil, udies were also made of the assimilation by plants P_2O_5 derived from radioactive phosphates. Oats, as, maize and potatoes were grown in Mitscherh pots containing soil to which suitable quanies of fertilizers other than phosphate were added the date of sowing or planting. One month after wing or planting, 3 different types of phosphatic tilizers, superphosphates, di-calcium phosphate d tri-calcium phosphate, were applied separately all four types of crop. Equal quantities of P_2O_5 re applied, in the form of phosphate, to each pot d the radio-activity of the quantity of phosphate plied to each pot was 300 μ. c. Measurements of dio-activity in the plants, made 11 days after plication of the phosphates, showed that rapidity absorption of P_2O_5 is conditional upon the water-lubility of the phosphate. In all cases the most $_2O_5$ was present in the plants where superphosate had been applied and the least where trilcium phosphate had been given. The degree of dio-activity (indicating the quantity of P_2O_5 esent) of maize, pea and potato leaves of different es is shown graphically for each phosphatic atment. In all cases the greatest quantities of $_2O_5$ were assimilated by the youngest leaves and e least by the oldest leaves. Measurements of the dio-activity of leaves of equal age on different stems of a single potato plant indicated that there were differences in assimilatory capacity between different stems of the same plant. It was also observed that important differences in capacity to assimilate P_2O_5 existed between individual plants of the same crop.—W.J.B.

1149 SMIRNOV, A. A. [**Method of measuring the activity of the phosphorus isotope, P^{32}.**] [Russian] *Biohimija* (*Biochemistry*) 1953, **18,** No. 2, 223-6, bibl. 3, illus.

1150 BONNIER, C. and others. Essai d'adaptation à *Soja hispida* de souches de *Rhizobium* non spécifiques. Influence de greffes sur la spécificité d'hôte du genre *Rhizobium.* [**Trials of non-specific strains of *Rhizobium* on *Soja hispida* and influence of grafts on the specificity of the host of *Rhizobium.***] *Bull. Inst. agron. Gembl.* 1952, **20,** Nos. 1-2, 137-40.

Stem grafting *Phaseolus vulgaris* on to *Soja hispida* [*Glycine soja*] resulted in nodule formation by a *Rhizobium* non-specific to ungrafted soyabeans.—M.A.

1151† BURTON, J. C. **Host specificity among certain plants in the cowpea cross-inoculation group.** *Proc. Amer. Soc. Soil. Sci.* 1952, **16, No.**4, 356-8, bibl. 13. [Res. Dep., Nitragin Co., Inc., Milwaukee, Wis.]

Fifteen strains of *Rhizobia*, selected for their efficiency on their host plants were used as single-strain inocula for *Cassia chamaecrista*, *C. leschenaultiana*, *Indigofera endecaphylla*, *I. hirsuta*, *I. pentosa*, *I. suffruticosa*, *Canavalia ensiformis*, *Phaseolus lunatus*, *Stizolobium utile*, *Arachis hypogaea*, *Crotalaria lanceolata*, *C. mucronata*, *C. juncea*, *Vigna sinensis* and *V. sesquipedalis*. The growth of *Vigna sinensis*, *V. sesquipedalis* and *Crotalaria lanceolata* was improved by all of 10 *Rhizobia* strains tested ; 9 strains were effective on *C. mucronata* and 8 on *C. juncea*. Growth of *Ph. lunatus* was improved by 2 out of 10 *Rhizobia* strains, while *C. ensiformis* and *S. utile* were improved by 3 out of 10 strains ; *A. hypogaea* growth was improved by 4 out of 10 strains. The only two isolates which improved *Ph. lunatus* and *C. ensiformis* came from these two host species and were completely ineffective on all other species, despite abundant nodulation. The findings of these studies are discussed in relation to the cowpea cross-inoculation group of plant species. It was concluded that *Rhizobia* with the ability to inoculate this group of plants were present in most soils, but few, if any, benefit the plants ; also, that the cowpea cross-inoculation group should be subdivided further and that the high susceptibility of the species in this group to inoculation by ineffective species, renders it highly important that artificial inoculants contain only effective strains of *Rhizobia*.—P.J.B.

1152† N.A.A.S. QUARTERLY REVIEW. **Polycross technique.** *N.A.A.S. quart. Rev.* 1953, **19,** 308-10, bibl. 7.

A brief review is made of the methods used in progeny testing of cross-pollinated crops.—M.A.

1153† FARKAS, G. and RAJHÁTHY, T. Szárazságellenálló fajták nemesítésének módzsertani kutatásai. [**Researches on methods of breeding drought-resistant plants.**] *Növénytermelés* 1952, **1,** No. 1, 5-26, bibl. 57, illus., Russian, English and German summaries pp. 24-6.

1154† HENKEL, P. A. [**Starch sampling as one o the methods for diagnosing drought resistance in plants.**] [Russian] *Doklady Akad Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1952 **86,** No. 5, 1049-52, bibl. 11. [Timirjaze Inst. Pl. Physiol., Acad. Sci. USSR]

Earlier studies on the characteristics of plants which have been examined as criteria of their resistance to heat (coagulation of protein in protoplasm) and drought (elasticity of protoplasm) are reviewed. [See also *Herb. Abstr.* 10 : 729 and 11 464.] In the light of works which have shown the significance of enzyme activity in drought resistance, the author has worked out a rapid method for determining such resistance. The method involves analysing the leaves (*Helianthus annuus* and *Solanum tuberosum* were used) for starch content. A low resistance to drought was found to be related to low starch content.—M.H.

MISCELLANEOUS

1155 EASTWOOD, C. G. **The contribution of the Colonial Empire to world food supplies.** *J. roy. Soc. Arts* 1952, **100,** No. 4867, 226-36, bibl. 3.

The part played by the Colonial Empire in the West Indies, South-East Asia, East, West and Central Africa in contributing to the food supplies of the world is discussed. Brief mention is made of some of the research projects (especially in the control of crop pests and diseases) in some of the territories.—K.L.

1156 WYLIE, J. C. **The value of sewage and refuse in promoting food production.** *J. roy. Soc. Arts* 1952, **100,** No. 4874, 489-506.

1157† MYERS, Amy. **A manual of seed testing.** 1952, pp. 80, illus., New South Wales; Dep. Agric.

This bulletin is written primarily as a reference work for the student seed-analyst in the commercial laboratory in Australia. Much of the information is taken from the Proceedings of the International Seed Testing Association. It includes an account with illustrations of: the formation and development of a seed, seed testing apparatus, sampling, purity analysis, purity testing and identification of impurities, tolerances allowed for purity tests, schedule of conditions for purity and germination tests, germination, judgement of the germination, of beans and peas, the sanitary condition of seeds, special treatments, the Seed Acts. Appendices are given on (a) a rapid indicator of germination and (b) suggested reference books.—K.L.

1158† JACKS, H. **Seed disinfection. 5.—A seed-dressing apparatus for the smaller seedsman.** *N. Z. J. Sci. Technol. Sect. B* 1953, **34,** No. 4, 249-51, illus. [Dep. Sci. Industr. Res., Auckland]

An electrically-powered seed-dressing apparatus has been designed to give ease of operation and optimum coverage of seed with protectant dusts. The capacity of the mixing-drum allows for treatment of 30 to 40 lb. of maize, French bean, pea, and wheat, and of 18 to 25 lb. of oats seeds.—Author's summary.

1159 GOPALKRISHNAN, K. S. and JUMP, J. A. **The activity of Thiolutin against certain fungi and seed-borne disease.** *Proc. Ind. Acad. Sci.* 1951, **61,** 97-102, bibl. 2. [Univ. Notre Dame, Indiana]

Thiolutin, an antibiotic isolated from *Streptomyces albus*, appeared to have no effect on the germination of the seed of maize, pea and radish, presoaked in water for 8 hr. before being germinated in 1, 10, 50 and 100 ppm. solutions of Thiolutin. Applications of 1, 0.5, 0.25, 0.125 and 0.0625% of the seed weight of Thiolutin as aqueous solutions and 1% of the seed weight of Thiolutin as a dust were made to oat seed infected with *Helminthosporium* spp. Other seed samples were treated with Spergon at the standard rates, whilst further samples were left untreated. Disease incidence in the untreated controls was 53%, in the samples treated with Spergon, 32% and in the samples treated with the 1, 0.5, 0.25, 0.125 and 0.0625% Thiolutin solutions, 6, 14, 14, 17 and 24%, respectively. Best control followed the 1% dust treatment, when disease incidence was only 3%. In similar trials with non-delinted cotton seed, Thiolutin was not as effective in controlling

lletotrichum gossypii as were Spergon, or New
proved Ceresan, but was more effective than
treatment.—P.J.B.

0† Martin, H. and Miles, J. R. W. **Guide to the chemicals used in crop protection.** *Canad. Dep. Agric. Sci. Serv.* 1952, pp. 236. [Univ. W. Ontario Sub-Post Office, London, Ontario]

e most important chemicals used at present for
e control of weeds, pests and fungi in crops are
ted. Among the information given for each is :
uctural formula, alternative names, history,
thod of manufacture, physical, chemical and
logical properties, formulation and methods of
alysis.—P.J.B.

1 Henriet, J. Compatibilités et incompatibilités en phytopharmacie. [**Compatibility and incompatibility of insecticides, fungicides and herbicides.**] *Rev. Agric., Brux.* 1952, **12,** 1291-310, bibl. 6, illus.

e interactions of 24 insecticides, fungicides and
bicides are described by means of a coloured
npatibility chart.—M.A.

2 Repp, Gertraud. Zur Kenntnis der Selektivwirkungen von 2,4-D- Verbindungen. I. Physiologische Reaktionen resistenter und empfindlicher Pflanzen und ihre ökologische Auswirkung. [**The selective effects of 2,4-D compounds. I. Physiological reactions of resistant and susceptible plants and their ecological significance.**] *PflSchBer.* 1952, **9,** No. 11/12, 161-81, bibl. 33, English summary p. 179. [Univ. Vienna]

e subject is discussed with special reference to
ad-leaved plants. The osmotic value of the
der-line plasmolysis is a criterion for the in-
encing of the carbohydrate metabolism by 2,4-D
ducts. Optimal growth conditions favour the
ect of 2,4-D.—From author's summary.

3 Davis, D. and Dimond, A. E. **Inducing disease resistance with plant growth-regulators.** *Phytopathology* 1953, **43,** No. 3, 137-40, bibl. 25. [Connecticut Agric. Exp. Sta., New Haven]

idies are reported on the chemotherapeutic
ivity of 2,4-D, α-naphthoxyacetic acid, 2,3,5-
iodobenzoic acid, β-naphthoxyacetic acid and
ole-3-acetic acid, when tested against *Fusarium*
t of tomato plants. All these materials reduced
incidence of the disease in the plants, though
y were relatively ineffective against the path-
n *in vitro*. The fungitoxic activity of the
terials in the plants was considerably increased
en inoculation with the pathogen followed treat-
nt by several days, particularly in the case of
-D. The mode of chemotherapeutant action is
cussed.—P.J.B.

1164 Scotland Department of Agriculture. **Wood-pigeons, rooks and carrion and hooded crows.** [n.d.], pp. 5.

A summary is given of methods recommended for controlling these pests of field crops.—M.A.

1165 Kuiper, N. H. **On 4^3 factorial designs with confounding.** *Neth. J. agric. Sci.* 1953, **1,** No. 1, 11-14, bibl. 4. [Agric. Coll., Wageningen]

1166 Keller, E. R. Beiträge zur Technik des landwirtschaftlichen Versuchswesens. III. Die Auswertung einfacherer Versuche. [**Contributions to the technique of agricultural experiments. 3. The evaluation of more simple experiments.**] *Schweiz landw. Mh.* 1952, **30,** No. 5, 179-85. [Eidg. Tech. Hochsch., Zürich]

Points considered are the arithmetic mean, the mean quadratic deviation or standard deviation, and the t-test.—G.M.R.

1167 Keller, E. R. Beiträge zur Technik des landwirtschaftlichen Versuchswesens. IV. Die Streuungszerlegung oder Varianzanalyse. [**Contributions to the technique of agricultural experiments. 4. Analysis of variance.**] *Schweiz landw. Mh.* 1952, **30,** No. 11, 379-96, bibl.10. [Eidg. Tech. Hochsch., Zürich]

Examples are given to show how the results of experiments may be interpreted by means of analysis of variance.—G.M.R.

1168 Poehlman, J. M. and Combs, J. B. **Use of punch cards to process small grain yield data.** *Agron. J.* 1952, **44,** No. 12, 624-5. [Fld Crops Dep., Univ. Missouri, Columbia]

A summary is given of the procedures carried out at the Missouri Agricultural Experiment Station when using the punch-card system for processing small-grain yield-data. The advantages claimed for the method are : economy, accuracy and speed in processing large amounts of data. Samples of cards, notebook sheets and tabulation sheets are available on application to the authors.—P.J.B.

1169† Argentina. Ministry of Agriculture. Progresos cientificos alcanzados durante 1952 por la Dirección General de Investigaciones Agricolas y sus dependencias técnicas. [**Scientific progress made during 1952 by the Department of Agricultural Research and the technical branches under its control.**] *Idia* 1952, Nos. 59-60, 1-92.

A description is given of the work carried out during 1952 at the various institutions devoted to agricultural science in Argentina.—W.J.B.

1170† Wells, A. J. [Ed.] **The British national bibliography annual volume 1952.** 1953, pp. 1044, London; Coun. Brit. Nat. Bibl., Ltd., 28 × 21 cm., £8.

This publication contains a list of the new British books published in 1952, based upon those submitted to the Copyright Office. They are classified according to the Dewey Decimal System and there are full author, title and subject indexes. The agricultural section covers pp. 370-80.—P.J.B.

1171† UNESCO. **Bibliography of scientific publications of South Asia (India, Burma, Ceylon). No. 6,** 1951, pp. 124, Delhi; UNESCO Sci. Co-op. Office S. Asia.

1172† Wiechers, S. G. and van Hoek, C. **Water desalting. By means of electrodialysis.** *Research, Lond.* 1953, **6,** No. 5, 192-4, bibl. 4, illus. [Gen. Tech. Dep., T.N.O., The Hague.]

Experiments using selective membranes in a multimembrane cell for desalting water are described. Low efficiency and high operating costs are at present limiting factors in the development of this procedure for treating water to be used in agriculture.—M.A.

BOOKS AND REPORTS

BOOKS

1173† Higgins, B. B. and others. **The peanut. The unpredictable legume. A symposium.** 1951, pp. 333, bibl. at end of each chapter, Washington; Nat. Fertilizer Ass., 23 × 15 cm.

This symposium on the groundnut by American authors was initiated and sponsored by the Plant Food Research Committee of the National Fertilizer Association. It was first projected in 1937 and resulted in a series of conferences of research workers over the period 1939-48. The mass of scattered and detailed data on the groundnut, both as a plant and as a crop, has been collated, sifted and presented in concise form. Each chapter closes with a valuable bibliography of selected references drawn from world literature. After an account of the origin and early history of the plant, there are interesting and detailed chapters on groundnut morphology, genetics, breeding, physiology and nutrition. The chapter on cultural practices is prefaced by the statement that research work on some of these has been rather limited. This is, of course, equally true for manurial practices, and indeed, one of the stimulating qualities of this book is that, in addition to presenting a summary of available knowledge on the groundnut, the chapter authors do not hesitate to mention where this is deficient and so point the way for the further research which must be carried out before this unusual legume can be made less unpredictable than it is at present. The two final chapters deal with groundnut pests and diseases and their control, and are followed by a useful index combining simple subject entries with the names of those scientists to whose work reference is made in the book.—C. L. Skidmore.

1174 Goldberg, R. A. **The soybean industry. With special reference to the competitive position of the Minnesota producer and processor.** 1952, pp. xv + 186, bibl. 155, Minneapolis; Univ. Minnesota Press: London; Oxford Univ. Press, 23 × 15 cm., $5.00.

This is not a book for the agronomist, nor does it set out to be. It is an economic survey of the secondary soyabean industry with particular reference to Minnesota, reference to the primary industry is restricted to one chapter, which is largely confined to a discussion of acreages under cultivation. From the economist's point of view, the interest lies in the fact that Minnesota might be described as marginal land for soyabean production, since it lies at the northern extreme of the area suitable for the cultivation of this crop. Not only are the yields comparatively low, but the percentage oil content ranks amongst the lowest recorded in the United States. (New varieties are being developed to overcome this difficulty, the most promising of which is Blackhawk.) In spite of this, however, the acreage under soyabeans in Minnesota expanded under the stimulus of war and shortages from 21,000 in 1939 to 1,072,000 acres in 1949. This increase was obtained mainly at the expense of hay and pasture. Minnesota possesses remarkable geographical advantages. The soyabean industry grew up around Decatur, in central Illinois, and soyabean prices in the States are based upon Decatur prices. The Minnesota manufacturer sells at Decatur prices plus the freight charges from Decatur to the point of sale, the difference between this and actual freight charges representing additional profit. On the other hand, he buys at Chicago prices less the cost of freight. Thus the Minnesota manufacturer gets a considerable financial advantage both ways, not only in local dealings, but also in trade with Canada and the western states.—N. G. Shreeve.

1175† Crocker, W. and Barton, Lela V. **Physiology of seeds. An introduction to the experimental study of seed and germination**

problems. 1953, pp. xv + 267, bibl. over 1100, illus., Waltham, Mass.; Chronica Botanica Co.: London; Wm. Dawson and Sons, Ltd., 23 × 16 cm., $6.50. [Boyce Thompson Inst. Pl. Res., Inc., Yonkers, N.Y.]

stated in the preface, this book, published as l. 29 of "A new series of plant science books" ted by Frans Verdoorn, is an attempt to give a ad coverage of our present knowledge on seeds l germination in a volume of moderate size and ist, therefore, be considered an outline rather in a treatise. While several classics in this field re written many years ago and others deal only h certain aspects of the seed problems, this ok, written from the standpoint of the investiga- , points out recent progress, as well as some un- ved problems, in the physiology of seeds. The bject matter is treated under the following ads: anatomy of seeds, seed production, chemi- composition of seeds, water relations of seeds, piration, factors affecting germination, dor- ncy, storage and life span of seeds, metabolic l energy changes in seed development and rmination, vernalization, embryo culture and d transmission of disease. The economic signi- nce of seeds and seed products is also discussed. cause of lack of space, no attempt is made to e an historical development of the various ics treated, and related topics, such as flower uction and seed dispersal, have not received ention. Stress is laid on the fact that problems seed physiology that seem settled by past periments may need a thorough re-study by w methods. Some recent investigations on the urious effects of soaking seeds under particular nditions illustrate this point. As to seed dor- ncy, it is shown that there are several types of mancy which may be overcome by a consider- e variety of treatments. The bibliography at end of each chapter gives references mainly to A literature, but there is also a good coverage foreign literature. There is a subject and an hor index, but a rather limited number of strations. It should be pointed out that this k was preceded by "Growth of plants," 1948, W. Crocker [see *Fld Crop Abstr.* 2 : 1458], and wenty years of seed research," 1948, by Lela V. rton and W. Crocker [see *Herb. Abstr.* 19 : 270], ich gave a detailed account of the work carried at the Boyce Thompson Institute and covered h topics as dormancy, storage and life span of ds.—E. B. Owen.

76† ELLISON, W. **Marginal land in Britain.** 1953, pp. 224, bibl. 63, maps 4, London; Geoffrey Bles, 22 × 14 cm., 25s.

rginal land is defined by the economist as that e of land "which under existing conditions of ces, costs, organisation and management, is only just worth bringing into use". This definition is quoted by Professor Ellison in his book, "Marginal Land in Britain," wherein he sets out, firstly, "to indicate the nature and extent of each of the various categories of marginal land. Secondly, to discuss the possibilities of increasing the output of grass and crops on such areas in the light of present-day knowledge and techniques; and, lastly, to consider the improvement of marginal land in upland areas with particular reference to the possibilities of raising more sheep and cattle, which, when fattened, would help to increase Britain's scanty meat supplies". These three primary aims are discussed in detail and the author makes extensive use of his own and other experimental evidence, the reports of the Hill Farming Committees (1944), the grassland survey of England and Wales (1939) and the results of various regional investigations carried out in different parts of the country. Moreover, the Hill Farming Act (1946), the Livestock Rearing Act (1951) and the Marginal Production Scheme are considered in regard to the opportunity they afford for bringing into full production those millions of acres considered capable of improvement.

There has been considerable discussion and controversy in recent years on the rehabilitation of our marginal land and it is an unenviable task, indeed, to analyse the mass of available information and opinion into a well-defined and comprehensive study. Professor Ellison's book is a high tribute to his expert knowledge of this difficult and controversial subject. A wealth of information, which can be put to immediate use in land reclamation, is made available to both the practical farmer and the technical adviser.

However, since opinions are divided on the proper utilization of our marginal land as a means of substantially increasing home-grown food supplies, it is to be regretted that no definite guidance is given in the concluding chapter. Perhaps Professor Ellison considers this to be a problem for the economist and administrator. Nevertheless, it is a serious omission in an excellent and timely volume and it is to be hoped that in subsequent editions the author will outline a constructive policy for large-scale reclamation of marginal land that could be undertaken in stages, starting with the more amenable areas, rather than those likely to yield a smaller reward for the effort expended.

Except for a few photographs such as "'Cluns' in Wales" and "Bracken v. reseeding," which fall short of the high standard of the others, the book is splendidly illustrated and the figures and costings quoted do not in any way detract from its general interest. There are a few obvious misprints in the text, and the Cahn Hill Improvement Scheme is referred to as the Cahn Hill Improvement Station. In addition it should be pointed out that the Grassland Map of England and Wales was compiled at the Welsh Plant Breeding Station and not as stated in the preface.—Ll. Phillips.

1177† Papadakis, J. Mapa ecológico de la República Argentina. [**Ecological map of the Argentine Republic.**] 1951, Pt. I [Text], pp. 158, bibl. in text, illus., Buenos Aires; Minist. Agric., 26 × 18 cm. Part II [Atlas], pp. 24, col. maps, 32 × 27 cm.

The author presents a system of classification of the world's climates based on the following norms: (1) the thermic conditions of the winter, notably the frequency and intensity of the frosts as the factors limiting the cultivation of citrus plants, winter oats and winter wheat; (2) the thermic conditions of the summer, notably the duration and the mean temperature of the hot season, governing the cultivation of cotton, maize or wheat; (3) the rainfall regime; and (4) humidity. A climatic study is made of Argentina by this method. It is illustrated by climograms for 23 different stations which show, by means of coloured graphs, the mean temperature, the lower limits of temperature (means of the absolute minima) and the humidity index for each month of the year. These diagrams facilitate an ecological interpretation of the climate. Ecological maps are provided and discussed to show the regions in which winter crops, summer crops, mid-season crops (potatoes, sugar-beet), forage crops, horticultural plants, fruit trees, tropical crops, and guayule (*Parthenium argentatum* A. Gray) may be successfully grown.—G. M. Roseveare.

1178† Papadakis, J. Posibilidades agrícolas de La Rioja, Catamarca, Tucumán, Salta, Jujuy, Corrientes, Santiago del Estero, sudoeste de Buenos Aires, sudeste de La Pampa y noreste de Rio Negro. [**Agricultural possibilities of La Rioja, Catamarca, Tucumán, Salta, Jujuy, Corrientes, Santiago del Estero, the south-west of Buenos Aires, the south-east of La Pampa and the north-east of Rio Negro.**] 1951, pp. 140, bibl. 3, illus., Buenos Aires; Minist. Agric., 26 × 18 cm.

This study of the Argentine regions listed is based on the author's own system of climatic classification as outlined in his "Ecological Map of the Argentine Republic" [see Abs. 1177]. It is illustrated by coloured maps and climograms which enable the ecological conditions of each region to be readily visualized, and is designed more especially as a guide for future planning. In addition to the ecological descriptive matter, it contains numerous suggestions for the improvement of forage production (pp. 13-14, 19-20, 25-6, 42-8, 73, 91-3, 98-9, 104, 128-9, 131), grassland and grazing management (pp. 18-19, 45, 72-3, 93-8, 99-100, 129, 130-1), cropping (pp. 23-4, 42-8, 68-71, 91-3, 103-5, 127-8) and horticulture under diverse conditions, as well as for the better utilization of soil and water resources, improvement of communications and the establishment of experimental stations.—G. M. Roseveare.

1179† Belgian Congo. Institut National pour l'Étude Agronomique du Congo belge [INÉAC]. Flore du Congo belge et du Ruanda-Urundi. Spermatophytes. [**Flora of the Belgian Congo and Ruanda-Urundi. Spermatophytes.**] 1952, 3, pp. 579, illus., Bruxelles; 25 × 16 cm., 300 fr.

[See *Fld Crop Abstr.* 5 : 315.] The third volume of this botanical work deals with the Rosaceae, the Connaraceae, the Mimosaceae and the Caesalpiniaceae. Each chapter includes descriptions of the family, genera and species, as well as keys to the identification of subordinate groups and notes on distribution, habitat, etc. Among the 2 last-named groups (generally included in the Leguminosae) are the genera *Acacia*, *Leucaena* (with *L. glauca*), *Faidherbia*, *Mimosa*, *Caesalpinia*, *Cassia* and *Bauhinia*. There are indexes of scientific terms and of vernacular names.—E. B. Owen.

1180 Andrews, F. W. **The flowering plants of the Anglo-Egyptian Sudan. Vol. II.** (**Sterculiaceae-Dipsacaceae**). 1952, pp. viii + 485, fig. 166, Arbroath; T. Buncle and Co., Ltd., 22 × 14 cm., 21s.

1181 Haselmere, Fernhurst Research Station. **Some crop protection problems in world agriculture. International Conference. June 1951.** 1952, pp. 116, bibl. in text, illus., London; Plant Protection, Ltd., 30 × 24 cm.

The report of this Conference contains the text of the addresses given and also a full, verbatim record of the discussions, to which scientists from all parts of the world contributed. The opening paper was delivered by Sir John Russell and dealt with the wastage of food supplies through pests and diseases. Subsequent papers were concerned with chemical weed control (W. G. Templeman, Jealotts Hill); synthetic organic insecticides, their value and limitations (J. H. Stapley, Fernhurst Res. Sta.); fungicides, their development and uses (J.F.H. Cronshey, Fernhurst); control of virus diseases (K. M. Smith, Plant Virus Res. Unit, Molteno Inst., Cambridge); and factors limiting crop protection progress (E. Holmes, Fernhurst). Finally, a demonstration of crop protection machinery was given (F. W. J. Lane, Fernhurst). Further illumination of the different subjects was obtained in the discussions, including valuable information on the position in the USA (L. M. Stahler, pp. 31-5) and on tropical experience

W. Andrews, pp. 35-7). Among many points ch emerged were the difference in the field es of applying hormone weedkillers, which is ch higher in Britain and some European ntries than in North America; the existence of rgely unsolved major problem in the relative icities of the esters, amines and sodium salts of chlorinated phenoxyacetic acids, especially PA and DCPA (2,4-D); the marked increase itrate content in the foliage of certain plants ough the application of 2,4-D; and the probable fulness of systemic insecticides for the control he insect vectors of virus disease. The publica- is helpfully indexed.—G. M. Roseveare.

2† Robbins, W. W. and others. **Weed control. A text-book and manual.** 2nd edn. 1953, pp. 514, bibl. in text, illus., London; McGraw-Hill Publ. Co., Ltd., 23 × 15 cm., 57s. 6d.

first edition of this textbook [see *Herb. Abstr.* 340] was published in 1942, a year dis- guished by the recognition and development as a ctive herbicide of 2,4-D by workers in Britain the United States independently. This dis- ery, together with that of MCP in Britain in 1, " is now historically recognised as amongst most important contributions of science in culture " [L. M. Stahler, 1952, *Fernhurst Conf.* . pp. 31-5]. According to the authors of 'eed control," the effects of these discoveries e been revolutionary. The new weedkillers e been accepted and used on a very large scale imated commercial production of 2,4-D and 5-T in the USA in 1949 and 1950, mostly for in the United States and Canada, was between nd 25 million lb. annually. [Stahler, loc. cit.]. er hormone-like chemicals have been found to promising as selectives, notable improvements e been made in equipment and machinery for application of weedkillers, and, above all, the decade has been one of greatly intensified arch on all aspects, chemical, biological, and ogical, of weed control, accompanied by a y extensive amount of literature.

In the second edition of this book, therefore, sections dealing with the chemical control of ds have of necessity been rewritten and much litional matter has been incorporated. Those ions which deal with specific weeds, the weeds ifferent crops, and special weed problems have been enlarged. In view of varying environ- tal conditions and regional methods of crop- , definite recommendations as to dosages of micals have been avoided; emphasis is placed ead upon principles. There is naturally a bias avour of the study of weeds which are of rtance in North America, but research from all s of the world is drawn upon. While the ature of the last decade has been reviewed, it is rly impossible to include any but a selected few titles in the bibliographies given at the end of each chapter. Attention is drawn to the U.S. Dep. Agric. Bibliography of Weed Investigations (1951 and onwards), which is published quarterly. This Bibliography presented over 2500 titles for 1950 alone [Stahler, loc. cit.]. New matter is found mainly in chapters 9 to 20, which are devoted to herbicides, selective and non-selective, their properties and functions, combination, and application.—G. M. Roseveare.

1183† England and Wales. Ministry of Agriculture and Fisheries. Bull. 147, **Electric fencing.** 1953, pp. 30, bibl. 12, illus., London; HMSO, 2s. 6d.

Farmers and advisory officers will welcome this publication in which the case for the extended use of the electric fence is presented with clarity and with notable attention to detail. A precise account is given of the advantages of electric over other types of fencing in respect of initial costs, cost of maintenance and adaptability to modern systems of farming. The detailed description of types of equipment, methods of erection, maintenance and fault-detection will be found enlightening and helpful by those who have encountered practical difficulties in the application of electricity to fencing. Sections are devoted to the adaptation of electric fencing to the control of all types of farm stock, to the preservation of crops against wild animals and to the controlled grazing and folding of herbage and arable fodder crops. There are appendices dealing with standard specifications for electrical equipment, with the design of fence controllers and with the legal aspects of electric fencing.—W. J. Baulkwill.

1184† Thompson, L. M. **Soils and soil fertility.** 1952, pp. 339, illus., New York; McGraw-Hill Book Co., Inc., 23 × 14 cm., $5.00, or 42s. 6d.

The work comprises 17 chapters in which information has been compiled for students taking an elementary college course in soils. The book begins with six chapters that deal with the physical, biological, and chemical properties of soils, and the formation and classification of soils. The remaining chapters deal with fertility and management. It is stressed that the work does not constitute a review of the literature in soil science.—M. Hall.

1185† Finney, D. J. **An introduction to statistical science in agriculture.** 1953, pp. 179, bibl. in text, illus., Edinburgh and London; Oliver and Boyd, 24 × 15 cm., 25s.

This book describes simply and clearly, without the use of complicated algebraic expressions, the fundamental aspects of statistical science in agriculture. Such terms as fractional replication, stratification, curvilinear regression and analysis of covariance, often puzzling to agronomists, are explained concisely and briefly. No claims are made that this book will enable agronomists and research workers to design and analyse their own experiments, but it will provide a basis for appreciating more advanced statistical literature and for the study of applied statistics in field experimentation.—M. Akenhead.

1186† Ogolevec, G. S. [**Encyclopaedical dictionary of medicinal-, ethereal-oil- and poisonous plants.**] [Russian] 1951, pp. 487, illus., Moscow; Seljhozgiz. [State Publishing Department for Agriculture], 27 × 18 cm., 21 roubles 50 kopeks, or 22s. 6d.

In addition to information on the plants (listed in alphabetical order under the Russian common names), the work contains brief information on general subjects which have bearing on agricultural science, e.g.: drought resistance of plants (by N. N. Kicelev); collective farms (by F. I. Lasskiĭ); crop rotations (by F. I. Lasskiĭ); climatic conditions in USSR (by F. I. Lasskiĭ); chlorophyll (by L. M. Utkin); botanic gardens (by V. N. Vorošilov); and mechanization (by N. P. Perepicko). Information on many other subjects is also included (but without indication of authorship), e.g.: winterhardiness in plants; the history and terminology of standards for medicinal plants; and the organization of scientific research institutes in the USSR.

The encyclopaedia is well produced and has clear type, many illustrations of plants and plant organs, and 20 coloured plates. There are indexes of: (1) popular names of plants (combined with the index of subjects which are briefly described); (2) Latin/Russian names of plants and plant families; and (3) subjects (described at greater length) listed with names of the authors. The first index is a help in the elucidation of many abbreviations, which are sometimes obscure but are in general use throughout Soviet agricultural publications, e.g. VIR [All-Union Institute of Plant Industry]; VASHNIL [All-Union Academy of Agricultural Sciences]; VILAR or VNIILAR [All-Union Scientific Research Institute for Medicinal and Aromatic Plants]; VNIIMK [All-Union Scientific Research Institute for Oil Plants], etc.

Finally, as an indication of the type of information supplied, mention may be made of the subject "soil," a description of which covers pp. 302-8. This includes a section on the geographical distribution of soil types in the USSR, discussed under the headings of the following six zones: (1) zone of tundra soils (occupying 8% of the territory in USSR); (2) turf/podzol and podzols (occupying about 31% of the whole territory in USSR); (3) grey forest-soils (5% of whole USSR); (4) typical black earths (7% of the whole territory); (5) chestnut soils and solonetz (5% of the whole territory); (6) light-brown soils, sands and solončaks (the most southerly zone and occupying about 10% of the whole territory of USSR).—M. Hall.

REPORTS

The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated.

1187 **Great Britain.** Long Ashton Agricultural and Horticultural Research Station. Annual Report 1951. Bristol, [n.d.], pp. 210. [Received 1952]

Investigations reported:

1. The effect on sugar-beet of the omission of the elements cobalt, nickel and gallium from sand-cultures. By E. J. Hewitt and E. W. Bolle-Jones pp. 62-5. The test elements were provided at the rate of 0.005 ppm. No evidence was found to show that these elements were essential to plant growth. A bibliography on the subject is provided.
2. The effect of manganese deficiency of oats on yield, and the treatment of the deficiency by soil applications of S and $MnSO_4$ and by foliar sprays of $MnSO_4$. By D. J. D. Nicholas and D. J. Fisher, pp. 77-87. [See Abs. 895.]
3. The effect of copper on the mineral status and growth of oats, rye, barley, sugar-beet and kale. By W. A. Forster, pp. 102-12. K, Ca, Mg, P, Fe, Mn and Cu status and yield data are given for oats grown in soils treated with Cu at various milliequivalent levels of copper sulphate solution. In oats 70 milliequivalents Cu significantly decreased the yield of tops and, at the second sampling only of roots.—w.j.b.

1188 **France.** Institut National de la Recherche Agronomique. Compte rendu des travaux effectués dans les stations argonomiques au cours de l'année 1951. [An account of the work carried out by agronomy stations in 1951.] *Ann. Inst. nat. Rech. agron., Paris. Sér. A. Ann. agron.* 1952, **3**, No. 4, 468-712.

Investigations reported:

1. Action of tocopherol on germination. By L. Delmas (Grignon), pp. 526-7. Seed wheat germinated more rapidly when treated with free tocopherol, or with tocopherol acetate, than did untreated seed.
2. Study of lime chlorosis. By P. Gounty and Mlle Mazoyer (Antibes), pp. 531-2. *Lupinus albus* was grown in jars of nutrient solutions which contained from 0 to 20% $CaCO_3$ in their composition. After flowering a chemical analysis of the aerial parts was made. With a high concentration

CaCO$_3$ there was evidence of a lower intake of the
ions NO$_3$ and PO$_4$ compared with cations.

Sodium excretion by plant roots. By G.
rbier and J. Chabannes (Versailles), pp. 532-3.
as and maize, grown first in a nutrient solution
ntaining 14 mg. Na per litre (3 plants per 1-litre
t with 4 replications) then in a sodium-free solu-
n, excreted on an average 1.13 mg. Na per litre
eas) and 1 mg. Na per litre (maize).

Comparison of the effects of ammonium nitrate
plied in autumn and at the end of winter to
eat, in Cornouaille. By Y. Coïc and M. Cop-
net (Versailles), p. 534. In this district an
plication of ammonium nitrate was most success-
after the end of February.

Action of winter rainfall on the nitrogen supply
wheat in the spring, in Cornouaille. By Y. Coïc
d M. Coppenet (Versailles), pp. 535-6. For
e variety, or for varieties giving the same yields,
or yields were obtained in wet winters when only
e application of nitrogen was made during end
bruary/March. This falling off in yield could be
rrected by the addition of nitrogen in April.

Improvement of the milling and baking quality
wheats by late nitrogen dressings. By Y. Coïc
ersailles), pp. 536. [See *Fld Crop Abstr.* 4 : 964.]
e results obtained from application of nitro-
nous manures on three varieties of wheat (Yga,
rsée hybrid, Hybrid 40) are tabulated in terms of
ight, protein content and baking quality.

Investigations into the toxicity of copper. By
Anne and M. Dupuis (Colmar), pp. 694-5.
pper sulphate acidified the soil considerably ; un-
ated control plots had a pH of 6 at harvest while
ts dressed with 0.4 g. of copper per kg. of soil had
educed pH of 5.3. Lucerne and red clover were
s susceptible to copper sulphate dressings than
eat or barley.—M.A.

89 **Switzerland.** Federal Experiment and Seed Control Station. Rapport d'activité 1932-1950. [Report for 1932-1950.] *Landw. Jahrb. Schweiz* 1952, **66**, No. 1, 17-97, bibl. 39, illus. [Monte-Calme, Lausanne]

VESTIGATIONS REPORTED :

1 Seed Control Division. By E. Oehler and J.
pin, pp. 19-63. Tabulated information is given
the number of seed samples analysed, the
mber of different crops and plant spp. concerned,
d the analysed results (mean, maximum and
nimum percentage purity and germination
pacity) obtained in different years. Further
ormation deals with seed analysis and certifica-
n of seedsmen, also with the field inspection of
d cultures (cereals, potatoes and clovers) and the
ervision of the trade in indigenous seed of
ected varieties.

2 Potato Division. By J. Muenster, pp. 87-95.
ministrative work covered the examination of
d potatoes and, from 1944 onwards, the field
inspection of seed-potato cultures. Information is given on the quantities of planting material produced, the area devoted to which has more than doubled since 1932. Research proper comprised : the examination of new varieties ; the determination of sanitary conditions by means of the tuber test and of virus disease by the inoculation of test plants ; the study of locally restricted leaf roll (1945) and its attribution to unfavourable soil conditions ; study of the biuret reaction method of determining the sanitary condition of tubers (examination of 50 tubers in 1945-6 did not prove the method to be satisfactory) ; experiments to determine the effect on the tubers of premature destruction of the foliage by chemical agents (sodium chlorate, etc.) ; and manurial trials, the results of which have been reported elsewhere. On the basis of periodic regional counts of the insect vectors of virus diseases, arrangements have been made for the premature destruction of the foliage of first-class potato cultures when there is danger of virus infection.—G.M.R.

1190 **Manitoba.** Department of Agriculture. Annual Conference of Manitoba Agronomists 1952. 1952, pp. 63.

The following items are noted :

1. A summary is given of yield and agronomic data from trials with common and durum wheat, oats, barley and linseed varieties grown in Manitoba, pp. 1-13. Notes are given on a new wheat variety, C.T. 186, to be released for 1954, and 2 new oat varieties. The first oat variety is Garry Selection 1692.27, which combines resistance to *Helminthosporium victoriae*, both types of smut, all stem-rust races and a number of crown-rust races, with higher yields than the original Garry variety. The second variety is R.L. 2123, which may be of value, though it has been shown to be susceptible to Race 7a of oat stem-rust.
2. Safflower trials, 1949-52, p. 15. The results are given of trials with 7 varieties of safflower (*Carthamus tinctorius*). One variety, N10, appeared to be of promise in view of its good yield and high oil content (28.6% oil over 3 years). From the trial results, no widespread safflower production in Manitoba can be recommended.
3. Manitoba oil seed rape, p. 16. Data from trials with Argentinian and Polish varieties are given. The former have outyielded the latter by a considerable margin.
4. Soyabean varieties, p. 16. Four selections from Pagoda have shown promise.
5. Control of cereal rusts by fungicides, p. 18. A number of fungicidal materials were applied to wheat infected with stem rust. The use of Zineb (Zn-ethylene-bisdithiocarbamate) and Sulforon dust (wettable S) resulted in much higher grain yields (32 to 36 bu. per ac.) than controls (15 bu. per ac.), though their effects on stem rust were

short-lived. The treatments were made 3 weeks before grain maturity.

6. Effect on Dakota linseed of various concentrations of mustard plants (*Brassica arvensis*) and their removal by 2,4-D butyl ester, p. 33.

7. The use of different herbicides on linseed, pp. 34-5. TCA was outstanding in the control of green foxtail (*Setaria viridis*). A single pre-emergence application of TCA at 8 lb. per ac. killed 90% of the green foxtail without harming the linseed. A second application of 8 lb. per ac. of TCA when the linseed was 2 to 4 in. high controlled all the green foxtail without injuring the linseed. Good results were obtained only where the green foxtail was under 2 in. high.

8. Control of field bindweed (*Convolvulus arvensis*), p. 36. One application of 12 or 16 oz. per ac. of 2,4-D ester (acid equivalent) in 11 gal. spray volume gave good control of field bindweed on summer-fallow land.

9. Breeding potato varieties at Manitoba University, pp. 49-50. Notes are given on the varieties Manota, Waseca, Cherokee, N.D. 457, 984-M1, S101 and S108.

10. Sugar-beet trials, pp. 52-3. In varietal trials, Klein Wantzleben N has given outstanding results. Notes are given of trials with different herbicides to control green foxtail (*S. viridis*) and wild oats (*Avena fatua*). Applications per ac. of 2 gal. of maleic hydrazide in 80 gal. of water on 20 August resulted in highly significant increases in the sugar content of the roots, with no effect on root weights. Similar treatment on 5 and 20 September had no effect on sugar content, or root weight.

11. A leaflet is appended giving varietal recommendations for cereals and oil-seed crops, for seed treatment of cereals and linseed and also information on the use of 2,4-D and MCPA for weed control in cereals and linseed.—P.J.B.

1191 **United States.** Proceedings of the 7th Annual Meeting of the Northeastern Weed Control Conference. 1953, pp. 352.

INVESTIGATIONS REPORTED :

1. Control of aquatic weeds. By R. B. Balcom, pp. 5-9.

2. Progress report on the crop toxicity period of CMU in a sandy loam soil. By L. L. Danielson and L. W. Easley, pp. 11-15. The crops used included beans and sweet corn.

3. Herbicidal comparisons between sodium arsenite and several experimental arsenical compounds. By R. E. Frans and R. J. Aldrich, pp. 17-22. [See Abs. 1072.]

4. The effects of 2,4-D applied to field-grown cotton at various stages of growth. By A. D. Baskin, pp. 23-31. [See Abs. 1072.]

5. Field-plot technique and statistical analysis for weed control experiments. By W. C. Jacob, pp. 35-7. Brief notes are given on size and shape of plots, the number of observations to be made, experimental designs and analysis of data.

6. The relative vapour activity of several dinitro compounds on cotton seedlings. By P. J. Linder and others, p. 51. The vapours of 6 dinitro compounds caused injury to cotton seedlings. Formulations containing DNOSBP ammonium salt were most injurious, followed in order by triethanolamine and alkanolamine salt formulations.

7. A root elongation test for herbicide screening. By J. W. Brown, pp. 53-5.

8. Preliminary investigations with dinitro and MCP sprays for weed control in peas undersown with legumes. By M. W. Miller, pp. 127-34. [See Abs. 992.]

9. Weeding sweet corn with dinitro herbicides. By M. F. Trevett and others, pp. 151-7. Ammonium and alkanolamine salts of DNOSBP under conditions of moderate rainfall following treatment were effective when used as pre-emergence treatments for weed control in sweet corn. Delaying treatment until 48-72 hr. before emergence gave better weed control than treatment at sowing time.

10. Planting and emergence applications of a water-soluble dinitro and CMU to field maize. By E. R. Marshall, pp. 169-73. [See Abs. 924.]

11. Pre-emergence weed control in silage corn with calcium cyanamide, 2,4-D and CMU. By C. R. Skogeley and D. A. Schallock, pp. 175-80. Treatment with 400, 500 and 600 lb. per ac. CaCN at 6 days after sowing gave good weed control and significantly higher forage yields than where no treatment was made.

12. Three years results with the use of MCP and 2,4-D for weed control in seeded grains. By E. R. Marshall and J. van Geluwe, pp. 181-6. [See Abs. 893.]

13. The effect of herbicides upon potatoes used for chipping. By T. Eastwood and J. S. Cobb, pp. 241-6.

14. The chemical control of northern nutgrass, *Cyperus esculentus*. By J. R. Orsenigo and O. Smith, pp. 329-39. [See Abs. **1122**.]—P.J.B.

1192 **United States.** Proceedings of the 7th Annual Meeting of the Northeastern Weed Control Conference. Supplement. 1953, pp. 88.

This supplement contains the Report of the Research Co-ordinating Committee (pp. 9-41), which summarizes those phases of the use of herbicides concerning which there is general agreement on methods, materials, concentrations to be used and proper usage. The information given is intended to serve as a guide to those concerned with making recommendations. Among the weeds itemized are: *Agropyron repens*, *Cyperus esculentus*, *Cirsium arvense*, *Allium vineale*, *Solanum carolinense*, *Barbarea vulgaris*, *Asclepias syriaca* and *Chichorium intybus*. Among crops specified are:

ll grains undersown with legumes, maize,
et corn, peas and potatoes.—P.J.B.

3 **Indiana**. Purdue University Agricultural Experiment Station. 65th Annual Report for year ending June 30th, 1952. Lafayette, 1952, pp. 167.

ESTIGATIONS REPORTED :
Small-grain testing. By R. Mulvey and
ers, pp. 7-8. A note is given on Mo. 0-205 spring
, which is recommended for southern Indiana
has considerably outyielded other named
ieties in trials. Mo. 0-205 is a cross of Colum-
× Victoria-Richland. Two new Purdue
ng oat varieties, C.I. 5940 and C.I. 5941, have
given very high yields. They are Clinton
Boone-Cartier crosses. A new experimental
ter oat 407-25-6 has outyielded, by a consider-
e margin, Forkedeer, the leading variety in
theastern Indiana. It was produced from a
ton × Hairy Culbertson cross.
Sulphur and manganese deficiency. By S. A.
ber and C. L. Garey, p. 31. As little as 400 lb.
ac. of S has eliminated Mn-deficiency in soya-
ns and wheat and raised their yields by about
%, compared with crops not treated.
Control of wireworms. By G. E. Gould,
45-9.
Ear length and maize yields. By A. M.
nson, p. 119. The average yields of maize
rids with different mean ear-lengths of 9.5, 8.5
7.6 in. were 120, 114 and 106 bu. per ac.,
ectively, showing that a highly significant
relation existed between ear length and grain
ds in the material tested.
Studies on the composition of soyabean oil at
erent stages of seed maturity. By R. O.
mons and F. W. Quackenbush, p. 122.
Studies on floral initiation. By A. C. Leopold
F. C. Guernsey, p. 124. Early flowering could
induced in Alaska peas by a combination of
perature- and auxin-treatment. A relation-
between the rate of respiration and floral
iation has also been shown to exist, which is
ely due to changes in oxidative enzymes in the
es, particularly the enzymes responsible for
aking down vitamin C.—P.J.B.

4 **Florida**. Soil Science Society of Florida. Symposium I. The control of water plants from the standpoint of water management and navigation in the lakes, rivers and canals of the South. Symposium II. The overall water control problem for south Florida. *Proc. Soil Sci. Soc. Fla.* 1948-49, pp. 159. [Received 1953]

ong the papers noted in these symposia are the
owing :
The general characteristics of the principal
ts involved. By E. West, pp. 15-20. Notes are given on the most important weeds in Florida canals. A list is given of floating, bank-side and submerged weeds.

2. The distribution of water hyacinth (*Eichhornia crassipes*) in Florida. By J. A. Hammack, pp. 21-8.

3. Alligator weed (*Alternanthera philoxeroides*), a new menace for Florida. By L. S. Evans, pp. 29-31.

4. The effect of certain herbicides on the water hyacinth and other aquatic plants. By F. W. zur Burg, pp. 92-9.

5. The control of aquatic weeds by chemical methods in the Florida Everglades. By C. C. Seale, pp. 100-7.

6. Control of submerged and emerged weeds in the feeder canal of the West Palm Beach water supply system. By R. P. Tomasello, pp. 108-10. —P.J.B.

1195 **Montevideo.** Inter-American Agricultural Conference. IV. Conferencia Interamericana de Agricultura, Segunda Reunion Regional Latinoamericana para la Agricultura y la Alimentación. Trabajos tecnicos. [Fourth Inter-American Agricultural Conference, Second Latin American Regional Food and Agriculture Reunion. Technical articles.] Montevideo, 1951, pp. 552. [Received 1952]

Articles of interest include the following :

1. Adaptation and selection of agricultural plants in Uruguay. By A. Boerger (Director, La Estanzuela Res. Inst., Uruguay), pp. 72-92, bibl. 57. An outline is given of the breeding of crop, herbage and forage plants at the Uruguayan Official Research Station, La Estanzuela, since 1912.

2. Control of weeds in cereals. By the Delegation from Chile, pp. 126-32. An account is given of experiments in the use of 2,4-D at different research stations in Chile. The value of the selective herbicides has been demonstrated. No difference was observed between the efficiency of the sodium salts, amines and esters, of 2,4-D. The best dosage was found to be approximately 600 g. free acid per hectare and the best time of application when the weeds first appear, i.e., in the young sowing. Further study of the degree of toxicity of the selective herbicides in regard to different plants, both crop and weed, is necessary.

3. Industrial plants. By the Delegation from Chile, pp. 150-2. This paper contains a short account of measures being taken to extend and improve the cultivation of oil-bearing plants, the sunflower in particular and, after it, groundnuts, soyabeans, sesame and spurge (*Euphorbia lathyris*), and of the fibre plants hemp, flax, and cotton.

4. Temperature and rainfall at La Estanzuela. By G. J. Fischer and Olga C. de Cortabarria (La Estanzuela Res. Inst., Uruguay), pp. 153-202,

bibl. 40, charts, illus. A full account covers the period 1915 to 1950. Appendices give information on seed multiplication as affected by the weather conditions of the last 10 years (A. Bonjour) and some observations on the water factor (M. Canel).

5. Maize smut. Attack observed in trials of commercial varieties at La Estanzuela, 1942-1949. By V. Gheorghianov and G. J. Fischer (La Estanzuela Res. Inst., Uruguay), pp. 210-24, bibl. 33, illus.

6. Eradication of insect pests, plant diseases and weeds. By H. L. Haller and others (U.S. Entomology and Plant Quarantine Service, etc.), pp. 225-31. A general consideration of the subject is presented, incorporating the results of recent research.—G.M.R.

1196 **Sierra Leone.** Department of Agriculture. Annual Report for the year 1950. Freetown, 1952, pp. 24, 1s. 6d.

INVESTIGATIONS REPORTED :

1. Selection and multiplication of swamp rices, pp. 11, 13, 14.

2. Experiments on water control, p. 11. The use of experimental polders in the Scarcies Circle again proved that complete denial of normal tidal flow over the land produces soil toxicity.

3. Tests of the possibilities of mechanical cultivation in riverain grasslands, p. 56.—M.A.

1197 **Belgian Congo.** Institut National pour l'Étude Agronomique du Congo belge. Rapport annuel pour l'exercice 1951. [Annual report for 1951.] Gembloux, 1951, pp. 436, bibl. 75, map.

INVESTIGATIONS REPORTED from various INÉAC Stations :

1. Climatic studies, pp. 92-107 and 415-16.

2. Rice. Studies on growth and transpiration, mainly in relation to soil moisture, pp. 28-9. Selection, p. 185. Varieties and varietal trials, pp. 193, 298, 330, 335-6, 359-60 and 378. Cultural trials, pp. 284-5.

3. Cotton. Selection, pp. 310-11, 337-9, and 355. Hybridization, p. 311. Multiplication, pp. 312, 335, 340 and 356. Varieties and varietal trials, pp. 314-15, 340-1 and 355-7. Crop rotation trials, pp. 321, 323-5 and 331-3. Manuring trial, pp. 328-9. Spacing trials, pp. 329-30 and 342. Seed disinfection, p. 335. Control of *Helopeltis bergrothi*, pp. 120-1. Influence of *Helopeltis* sp. and *Dysdercus* sp. on production and quality of seed-cotton, p. 121. Control of *Lygus* sp., p. 128. Wilt, *Fusarium vasinfectum*, control, pp. 312-14. Influence of climate on yield, p. 316. Trials showing an increase in yield from heavy mulching (over 100 tons of fresh *Pennisetum purpureum* per ha.), pp. 322-3 and 333-5.

4. Maize. Selection, pp. 184, 235 and 342-3. Hybridization, pp. 183, 235 and 343. Multiplica tion, pp. 343-4. Varieties and varietal trials, p 193, 285, 298, 344-5, 358, 369, 375, 405 and 41 Yield, p. 306. Sowing date, pp. 359 and 375- Spacing, p. 376. Manuring, pp. 376-7. So preparation, pp. 383-4. Control of *Calandr oryzae* in storage, p. 125. Germination capacit of stored seed treated with DDT and BHC, p. 12

5. Control of the fungus " Shimbu " on cotto and maize, p. 127.

6. Groundnuts. Selection, pp. 318 and 34 Multiplication, p. 346. Varieties and varietal trial pp. 191-3, 285, 299, 335, 346, 379 and 405- Yield, p. 306. Seed germination, pp. 185-7. See treatment, pp. 128-9. Sowing depth, pp. 359 an 380. Sowing method, p. 380. Sowing date, p. 38 Manuring trial, pp. 380-1. Irrigation, p. 362

7. Sorghum. Varieties, pp. 235, 257, 286, 36 and 403. Spacing, p. 236. Control of *Calandr oryzae* in storage, p. 131.

8. Potato. Varieties and varietal trials, pp. 23 369, 393-4, 404 and 410-12. Treatment of see potatoes, pp. 136-7. Soil disinfection for wil control, pp. 137-8. Susceptibility of varieties t wilt, p. 139. Sowing date, p. 395. Manurin trial, p. 394.

9. Soyabean. Selection, p. 188. Varieties an varietal trials, pp. 286, 319, 335, 348, 361, 371 381-2, 403-4 and 413.

10. Cassava. Selection, pp. 189 and 349. See scarification with sulphuric acid, p. 189. Varietie and varietal trials, pp. 238, 257, 273, 349, 382-3 an 405. Varietal resistance to root rot, pp. 349-50 Spacing, pp. 350 and 361. Storage, p. 350. Trial to evaluate the losses in cassava yield resultin from cutting the cassava stems at soil level t facilitate the sowing of maize between the rows native practice sometimes repeated once or twic during the vegetative period of cassava) hav shown that this practice reduces cassava yield considerably, pp. 350 and 360.

11. Sweet potato. Introduction, p. 189. Selection, pp. 270-1. Varieties and varietal trials, pp 237, 271, 306, 351, 360, 369 and 413. Sowin date, p. 404.

12. *Eleusine* sp. Selection, p. 236. Varieties p. 412. Sowing date, p. 257.

13. *Phaseolus* spp. Varieties and varietal trials pp. 237, 271, 286, 319, 359, 382, 406 and 41 Yield, p. 347. Spacing trial, p. 348. Sowing date pp. 272 and 348.

14. Sunflower varieties, pp. 238, 351, 361, 371 383 and 413.

15. *Urena lobata.* Selection, pp. 302-3. Manuring trial, p. 303.

15. Trials to compare several fibre crops, pp. 304 385 and 400. *Sida rhombifolia* was promising.

17. *Pennisetum typhoideum.* Selection, p. 377 Varietal trial, p. 377. Spacing trial, pp. 377-8.

18. Wheat selection, p. 411.

Malting barley varieties, p. 414. Oat variet-
p. 414. Yam varieties, p. 382.
Voandzeia subterranea. Varietal trial, p. 381.
wing method, p. 381.
Studies on crop rotations, pp. 180-2, 193-4,
3-9, 357 and 410. Intercropping, pp. 239-40.
Cultural methods on fen land, p. 410. [See
d Crop Abstr. 5 : 669.]—E.B.O.

98 **Uganda Protectorate.** Department of Agriculture. Annual Report for the year ended 31st December, 1951. Entebbe, 1952, pp. 56.

e *Fld Crop Abstr.* 5 : 675.]
VESTIGATIONS REPORTED :
Work on rosette disease of groundnuts carried
t at Serere established the fact that close spacing
duced the numbers of infections per unit area,
26.
Surveys of blackarm infection of cotton in the
d showed that the effect of seed dressing in two
ccessive years progressively reduced the disease,
27.
Trials of spraying and dusting young cotton
ainst *Lygus* continued, p. 27.
Trials of imported Pasmo-resistant varieties
flax indicated that Formosa and Hollandia from
lland were the most promising, p. 35.—M.A.

99† **Kenya.** African Land Utilization and Settlement. Annual report for 1952. Nairobi, 1953, pp. 37, illus. 80.

e description of the numerous land settlement, soil conservation, grazing control and water supply schemes is illustrated by numerous excellent photographs.—M.A.

1200 **Tanganyika.** Department of Veterinary Science and Animal Husbandry. Annual Report for 1951. Dar es Salaam, 1952, pp. 40, 3s.

Run-off and soil-erosion experiments at Mpwapwa, p. 24. This experiment demonstrated the effectiveness of partial or total grass cover in reducing soil erosion under Central Province conditions.—M.A.

1201 **Basutoland.** Department of Agriculture. Annual Report for the year 1952. Maseru, [n.d.], pp. 40.

A summary of soil conservation work done during the year is given.—M.A.

1202 **New Zealand.** Department of Scientific and Industrial Research. 26th Annual Report. Wellington, 1952, pp. 84.

[See also *Fld Crop Abstr.* 5 : 1393.]
INVESTIGATIONS REPORTED :
Crop Research Division: Hilgendorf wheat, analysis of threshing returns; new wheat varieties; breeding of mildew-resistant wheat strains of Cross 7, Yielder and Hilgendorf; oats, resistant to lodging (the Welsh variety S225 was the only one not subject to lodging to heavy land); varietal trials of barley, potatoes, rape, flax, lupins and peas, pp. 14-16.—M.H.

NEWS ITEMS AND NOTES

w Zealand

)3† MR. F. R. CALLAGHAN has recently retired from his
t as secretary to the council and permanent head of
New Zealand Department of Scientific and Industrial
search, and has been succeeded by Dr. W. M. Hamilton,
istant secretary in control of the agriculture and
logy branches of the Department. Mr. Callaghan in
36 became chief executive officer of the Plant Research
reau, which comprised the Plant Diseases Division, the
asslands Division, the Crop Research Division, the
tomological Research Station, and the Botany Division,
d he was largely responsible for the development of
ricultural research in the Department. He was officially
pointed assistant secretary in 1935, deputy secretary in
39, and finally secretary and permanent head in 1947 in
ccession to Dr. E. Marsden. During his service with
Department, Mr. Callaghan has seen it grow from a
all beginning to a large organization of great import-
ce to New Zealand science, and the success of this ex-
nsion is in no small way due to his efforts. His succes-
, Dr. Hamilton, joined the Department in 1936 and in 1941 deputized for Mr. Callaghan as chief executive officer of the Plant Research Bureau. He was appointed assistant secretary in charge of the agricultural and biological branches in 1948.—*Nature, Lond.* 25 April, 1953.

USA

1204† DR. O. S. AAMODT, who has been in charge of the Alfalfa Improvement Project of the U.S. Dep. Agric., Bureau of Plant Industry, has been designated to serve as a Technical Co-operation Specialist, in which capacity he will represent the Bureau of Plant Industry in regard to USA technical assistance programmes in foreign areas.—*B.P.I. Memo*. No. 2081, U.S. Dep. Agric., Beltsville, Md.

USSR

1205† STATE VARIETY-TRIAL PLOTS have been organized in zones in White Russia with different types of soils and climate. The adaptation to the region (regionalization) of different varieties of the following crops: spring and winter wheat, winter rye, spring barley, oats, millet, buckwheat, peas, beans, vetches and lupins (for green manure) is described in *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, 19, No. 1.—M.H.

Great Britian.

1206† THE BRITISH JOURNAL OF ANIMAL BEHAVIOUR. This is a new, quarterly journal published under the auspices of the Association for the Study of Animal Behaviour, to replace the *Bulletin of Animal Behaviour* previously issued by this Association. Its scope is wide and includes all aspects of the behaviour and comparative psychology of animals, birds, insects and marine life. This journal will be particularly welcome to many workers in the fields of agricultural and veterinary science, since it will include many papers on the grazing behaviour of livestock, a field of study that has become of increasing significance in recent years. Original papers and reviews are invited and should be sent to: The Editors, British Journal of Animal Behaviour, Cromwell House, Huntingdon. The annual subscription is £1. 7s. 6d., or $5.00.—P.J.B.

Enquiries received

1207† The following are amongst the subjects of enquiries received and answered by this Bureau during the period January to May, 1953. Further information regarding them can be obtained from this Bureau, if required:

Influence of plant population on the yield of British cereals, bibliography on.

Long sprouting of potatoes.

Choice of crops for sowing after flood damage by seawater.

Stubble weight of cereals, figures for.

The use and treatment of cut setts in the cultivation of the potato crop.

Fracture of rice grains during ripening.

Potato storage and temperature maintenance by electricity, literature on.

Depth of drilling for cereals, synopsis of experimental work on.

Influence of grasses and legumes on soil structure, root growth, erosion and crop yields.

FIELD CROPS

CEREALS

HEAT

08 Porter, K. B. and others. **Wheat production in the Panhandle of Texas.** *Bull. 750. Texas agric. Exp. Sta.* 1952, pp. 38, illus.
commendations for the cultivation of wheat in Panhandle region of the High Plains of northst Texas are given. The most important varieties this region are : Westar, Comanche, Triumph l Wichita.—P.J.B.

09 Šošić, B. and Miržinska, Y. [**The best time for sowing winter wheat.**] [Serbo-Croat] *J. sci. agric. Res., Belgrade* 1951, **4**, No. 6, 99-111, bibl. 8, French summary p. 111. [Received 1953]
e advantages which result from sowing winter eat in Jugoslavia during the period 10 to 20 ober are discussed.—M.H.

0 Čeredničenko, S. V. [**Increasing the yield of spring wheat.**] [Russian] *Sovet. Agron.* (*Soviet Agron.*) 1953, **11**, No. 1, 23-8. [Grain Collect. Fm, Šahter, Stalinsk Prov., Ukraine SSR]
m work carried out during several years on two ns located on black earth in the south-east of Ukraine, the most satisfactory cultural meaes for obtaining good yields of wheat have been lved. The 10-course rotation used is as follows : fallow ; (2) winter wheat ; (3) spring wheat n with herbage ; (4-5) ley ; (6) winter wheat ; fodder grain 75% and sunflower 25% ; (8) ow ; (9-10) winter wheat. Thus, 4-courses in the ation comprise winter wheat (a total of 8800 ha.) one comprises spring wheat (2200 ha.). Spring eat is preferred to winter wheat for sowing with herbage as this ensures better herbage yields. spring wheat varieties, the most suitable are anopus 37 and Melanopus 69. Details of the uisite cultural measures are supplied.—M.H.

21 Thompson, E. G. **Wheat varieties [in Great Britain].** *J. nat. Inst. agric. Bot.* 1952, **6,** No. 2, 289-95. [Paper read at the Crop Conference held at the Cambridge Union Society on 16th and 17th December, 1952.]

22 Denmark. Statens Forsøgsvirksomhed i Plantekultur. Forsøg med hvedesorter 1947-51. [**Varietal trials with wheat (in Denmark) 1947-51.**] *Tidsskr. Planteavl* 1953, **56,** No. 2, 341-4.
The results are reported of trials with 9 wheat varieties at 9 locations. Only 4 varieties were tested throughout the whole trial period. Of these, Jubilé gave the highest average grain yield of 46.9 hkg. per ha., followed by Pajbjerg Konge II, Weibull's Eroica and Svaløf's Hansa, with 45.8, 45.0 and 44.7 hkg. per ha., respectively. The remainder of the varieties tested gave 3-5% lower grain yields than the mean of the above 4 varieties. These remaining varieties were : Svaløf's Skandia III B, Trifolium 37/1167, Pajbjerg Ideal, Bellevue and Weibull's Aros. After the hard winter of 1947, winter-hardiness observations were made. Weibull's Eroica, Svaløf's Hansa, Pajbjerg Ideal, Trifolium 37/1167, Pajbjerg Konge II and Jubilé gave yields 71, 71, 55, 53, 38 and 15% lower, respectively, than the means of their 1948-51 yields. Brief descriptions are given of each variety.—P.J.B.

1213 Jongh, G. **The baking value of wheat varieties grown in the Netherlands.** *Euphytica* 1953, **2,** No. 1, 6-14, bibl. 5, illus. [Cereal Dep., Cent. Inst. Nutr. Res., T.N.O., Wageningen]
Notes are given on different methods of assessing the baking quality of wheats. In determinations of the baking quality of the 1950 harvest in the Netherlands, among winter wheat varieties, Alba had the highest baking quality, followed in order by Cappelle, Juliana, Minister, Heine's VII, Staring and Carsten's V. Among spring wheats, Koga was best, followed by Hera, Blanka and Peko. Carsten's V had a high protein content, but very poor baking quality, showing that protein content was a poor index of baking quality. Data are given showing that standardization of the dough consistency after the last fermentation period had certain advantages over standardizing dough consistency before fermentation. The addition of $KBrO_3$ to the dough significantly improved baking-test results. —P.J.B.

1214 Malato-Beliz, J. Dos nuevas variedades botánicas de *Triticum polonicum* L. [**Two new botanical varieties of *Triticum polonicum* L.**] *Bol. Inst. Invest. agron.* 1952, **12,** No. 27, 589-91, bibl. 7, illus., English trans. pp. 590-1. [Pl. Breed. Sta., Elvas, Portugal]
The 2 awnless varieties described, var. *tellezii* and var. *ciferrii*, are thought to be natural hybrids of *Triticum polonicum* and, possibly, an awnless form of *T. aestivum*.—E.B.O.

1215 Malato-Beliz, J. Novos trigos Portugueses. Classificação e descrição botanica. I. [**New**

Portuguese wheats. Classification and botanical description. I.] *Melhoramento* 1952, **5,** 1-20, bibl. 4, illus., English summary pp. 14-20. [Pl. Breed. Sta., Elvas, Portugal]

The following new hybrid wheats are described. *T. vulgare* : Sagres, Condestável, Morena, Lusitano, Gil Vaz, Africo, Raisno, Peninsular, Salvador ; *T. durum* : Amarelejo.—W.J.B.

1216 SILVELA, F. T. Sobre la tipificación de los trigos comerciales españoles. [**The standardization of the Spanish commercial wheats.**] *Bol. Inst. Invest. agron.* 1952, **12,** No. 27, 545-72, illus., French and English summaries p. 572. [Cent. Cerealicult., Madrid]

Although there are many wheat varieties grown in Spain, the number of those of commercial importance is relatively small. These belong mostly to *Triticum vulgare*, followed in importance by *T. durum.* It is proposed to group them in 7 main grades, the requirements for each grade being given.—From author's summary.

1217 GRILLOT, G. L'état de l'amélioration du blé dur au Maroc. [**The improvement of durum wheat in Morocco.**] *Terre maroc.* 1953, **27,** No. 282, 145-50. [Serv. Rech. Agron. Exp. Agric., Maroc]

An account is given of the work carried out to improve the growing of durum wheat by the selection and introduction of new varieties. Information is given on recommended new varieties suitable for cultivation, either with or without, irrigation, in particular regions of Morocco.—E.B.O.

1218 ERROUX, J. Les blés des oasis. [**The oasis wheats.**] *Bull. Soc. Agric. Algér.* 1952, No. 567, pp. 10, bibl. 12, illus. [Ecole Nat. Agric. Alger.]

The wheats grown under irrigation in the oases of the Sahara have been classified, in a general way, as belonging to *Triticum vulgare* var. *oasiculum* and *T. spelta* var. *saharae.* The different forms within these 2 groups, which are difficult to classify because of the presence of intermediate types, are described and discussed. *T. durum* is of little importance in the Sahara.—E.B.O.

1219 ERROUX, J. Comportement de quelques variétés de céréales dans les jardins fezzanais. [**Behaviour of some cereal varieties in the Fezzan gardens.**] *Bull. Liaison sahar.* 1952, No. 11, pp. 8. [École Nat. Agric. Alger.]

The local cereal varieties, mainly wheat, grown under irrigation in the Fezzan oases, are perfectly adapted to the climate of the Sahara but they are heterogeneous and it is difficult to improve them. An account is given of the work carried out to replace them with new varieties of soft wheat, durum wheat and barley from northern Africa, mainly from the Central Station at Maison-Carrée.—E.B.O.

1220 THORPE, H. C. **A note on the release of new cereal varieties—IV.** *E. Afr. agric. J.* 1953, **18,** No. 3, 99, bibl. 1. [Dep. Agric., Kenya]

A brief description is given of wheat variety No. 321, BT. 1.B.1, released for sowing in the 1952-3 season.—M.A.

1221 MAREE, H. J. **New wheat varieties in the Highveld region.** *Fmg in S. Afr.* 1953, **28,** No. 325, 139-40. [Coll. Agric. Potchefstroom]

General information is given on wheat varieties in different regions of the Orange Free State. Advice is given on the most suitable dates for sowing wheat when both grazing as well as grain are required. The results of a trial at Potchefstroom showed that spacing did not greatly affect yield.—M.A.

1222 THOMAS, I. **New cereal varieties in Australia.** *J. Dep. Agric. W. Aust.* 1953, **2,** No. 2, 213-14.

Particulars are given of four new wheat varieties, Spica, Saga, Sabre and Reldep and one flax variety, Boyup.—M.A.

1223 THOMAS, I. and REEVES, J. **Wheat variety trials on research stations 1952.** *J. Dep. Agric. W. Aust.* 1953, **2,** No. 2, 201-11.

Tables show the varietal characteristics and yields of different varieties of wheat recorded during 1952 in 5 localities. A list of recommended varieties is given. Of the mid-season and late-maturing varieties, Bencubbin 48 gave the highest yields of stem-rust-resistant wheats, except at one centre. Eureka and Kondut gave the best yields of those varieties not resistant to stem-rust, at 2 of the centres. Of the early-maturing varieties, Insignia and Insignia 49, over two seasons, yielded as well as, or better than, the control Bungulla and are judged capable of high yields under a wide range of soil and climatic conditions. Both Gabo and Wongoondy were equal to, or outyielded, Bungulla at 4 of the 5 centres.—M.A.

1224 BHATNAGAR, M. P. **Rust-resistant wheat varieties for Rajasthan.** *Indian Fmg* 1953, **2,** No. 12, 27.

From trials conducted at the Basi Farm (Jaipur), varieties N.P. 710, 715, 718 and 758 gave the highest yields and are recommended as rust-resistant varieties.—M.A.

1225 SHAW, D. E. and VALDER, P. G. **A study of the microflora of wheat grains in New South**

Wales. *Proc. Linn. Soc. N.S.W.* 1953, **77,** 307-22, bibl. 67.

226 JONES, C. R. and CAMPBELL, J. D. **Microdetermination of endosperm density as a means of mapping moisture distribution in wheat grains.** *Cereal Chem.* 1953, **30,** No. 3, 177-89, bibl. 14. [Brit. Flour Mills, St. Albans, England]

227 LINSKENS, H. F. Über den Trocknungsprozess an progressiven Keimstadien. [**Drying processes and their effect on seed embryos.**] *Angew. Bot.* 1952, **26,** No. 5, 255-63, bibl. 30, illus. [Bot. Inst., Univ. Köln]

rying experiments on wheat seed which had ready been partially germinated showed that the gree of damage to the seed depended on the pidity with which water was removed from the ed and the stage of development of the embryo rying partially germinated seed at 50°C. for 4 hr. resulted in only approximately 5% gerination after treatment.—M.A.

228 LEDINGHAM, R. J. **Growth cracks in wheat seed.** *Canad. J. agric. Sci.* 1953, **33,** No. 2, 198-9, bibl. 2, illus. [Pl. Path. Lab., Saskatoon, Sask.]

note is given on the incidence and possible causes cracks in the pericarp and testa on the ventral le of wheat kernels of the 1951 wheat harvest in stern Canada. Grain samples were found contining up to 6% cracked kernels. The cause of the mage is not known, but is thought to be concted with slow maturation of the crop in cool, mp conditions ; 2,4-D damage may also have en a contributing factor.—P.J.B.

229 MILNER, M. and SHELLENBERGER, J. A. **Physical properties of weathered wheat in relation to internal fissuring detected radiographically.** *Cereal Chem.* 1953, **30,** 202-12, bibl. 7. [Kansas State Coll., Manhattan]

udies, using radiographs, are reported on internal suring of wheat grains caused by repeated etting and drying, either in the field, or in the boratory. There were no detectable endosperm sures in wheat grain wetted to 20.4% moisture ntent and then re-dried in air at room temperares, while fissures appeared when such grain was ain wetted and dried under the same conditions. was considered that very minute fissuring, unetectable by the means used in these studies, curs in grain subjected to mild wetting and drying conditions. The decrease in grain density caused fissuring was irreversible. Naturally weathered, ternally fissured, grain took up more moisture on etting than did similarly wetted normal grain.—J.B.

1230 ESBO, H. and KOLK, H. Svartrostens (*Puccinia graminis tritici*, Eriks. & Henn.) inverkan på veteskördens kvalitet och dess värde som utsäde. [**Quality and seed value of spring wheat damaged by black stem rust** (***Puccinia graminis tritici*, Eriks. and Henn.**)] *Medd. 28. Frokontrollanst. Stockh.* 1953, 29-43, bibl. 5, English summary pp. 42-3.

Laboratory and field trials in Sweden are reported on the germination and seedling growth of spring wheat seed damaged by black stem-rust. Three different seed samples were taken from lots containing seed damaged by black stem-rust. These were : (a) normal-sized seed, (b) and (c) seed with a 1000-grain weight 20% and 40%, respectively, below that of normal-sized seed. In laboratory trials, the germination and shooting capacity of all 3 seed samples were similar. In field trials, the emergence of sample (c) averaged 5% lower than that of sample (a). In laboratory tests, the plant weights of samples (b) and (c) at 16 days after sowing were 12 and 33%, respectively, below those of normal-sized samples. In similar field trials, respective plant weights for samples (b) and (c) were 20 and 40% below sample (a) at one month after sowing ; at 3 months after sowing, samples (b) and (c) were still 6 and 16% lower than sample (a). It was concluded that for seed samples damaged by black rust, the normal tests for germination and sprouting capacity do not give a reliable index of seed value, that seed size should be taken into account when evaluating seed, and that the value of such seed was closely correlated with its 1000-grain weight.—P.J.B.

1231 STRYCKERS, J. Bestrijding van windhalm of pluimgras (*Apera spica-venti* P.B.) met kalkstikstof in tarwe. [**Control of silky bent grass** (***Apera spica-venti* P.B.**) **with nitrochalk in wheat.**] [Reprint from] *Landbouwtijdschrift* 1951, **4,** No. 12, pp. 6, bibl. 7. [Received 1953] [RijkslandbHogesch., Gent, Belgium]

In trials in Belgium, good control of silky bent grass in winter wheat was obtained by broadcasting 150-200 kg. per ha. of nitrochalk or calcium cyanamide during February or early March on frozen, but not snow-covered, ground immediately before a mild spell of weather.—P.J.B.

1232 SHIVAPURI, T. N. and SINHA, R. P. **Studies on weed eradication in Uttar Pradesh.** *Proc. 40th Indian Sci. Congr. 1953* Pt. 3, 146. [Calcutta]

Weeds growing in a wheat crop were treated with Fernoxone, Agroxone and Dicotox in trials in which the cost of treatment with chemical weedkillers was compared with that of mechanical weeding. *Asphodelus tenuifolius* and *Chenopodium album* were completely killed by the chemical treatments.

Melilotus indica, *M. alba*, *Medicago denticulatus* and *Convolvulus arvensis* were also killed, but *Spergula arvensis* was unaffected. Spraying with Agroxone at 2 lb. per ac. was much cheaper than mechanical weeding and was the most economical of the chemical treatments. Dicotox at 4 gal. per ac. damaged the wheat.—W.J.B.

1233 SCHMIDT, H. H. *Cephalaria syriaca* Schrad. als Verunreinigung von Brotgetreide. [***Cephalaria syriaca* Schrad. as an impurity in cereals used for bread-making.**] *Getreide u. Mehl* 1953, **3,** No. 1, 1-3, bibl. 9, illus. [Staatsinst. Angew. Bot. Hamburg]

A description of the plant and the effect of varying admixtures of its seed on the quality of bread are given.—M.A.

1234 LAST, F. T. **Some effects of temperature and nitrogen supply on wheat powdery mildew.** *Ann. appl. Biol.* 1953, **40,** No. 2, 312-22, bibl. 11. [Rothamsted Exp. Sta., Harpenden, Herts.]

The wheat variety Red Standard was more susceptible to infection by *Erysiphe graminis* at 14-20°C. than at *c.* 7°C. Conidia were produced per unit area of pustule more than ten times as rapidly at 14°C. as at 7°C. The increased susceptibility of wheat to mildew after applying nitrogenous fertilizer (N) was associated with changes in its growth rate. Both growth rate and susceptibility increased to a maximum and then declined ; the curves for the two were parallel, with a lag of some days between effect on growth rate and effect on susceptibility. Plants that had passed through the susceptible phase and became resistant to mildew, again became susceptible when supplied with more N. Nitrogen-deficient plants continuously resisted infection. The higher the average growth rate during an experiment the greater was the total amount of infection. Increasing the average growth rate was soon followed by a sharp increase in the amount of infection. When plants of two size groups received the same amount of N the initially smaller plants became more heavily infected than the larger plants.—Author's summary.

1235 FEEKES, W. De waarde van de zaaitijdproef voor het veredelingswerk. [**The value of sowing-date trials for plant breeding.**] *Tech. Rep. 5. Cocobro Inst., Wageningen* 1952, 47-53, bibl. 12, illus., French summary pp. 71-3.

It was shown that later-than-normal sowing increased the susceptibility of most winter and early spring wheat varieties to black rust [*Puccinia graminis*]. A few varieties of winter wheat, among them Dr. Lasser's Dickkopf (an Austrian variety), retained their immunity to the disease even when sown in the spring. Details of varietal resistance to black rust as determined in these experiments are given in an appendix.—W.J.B.

1236 CAÑAMÁS, R. and URRÍES, M. J. de. Reacción de una colección de trigos del Centro de Cerealicultura a las razas 14, 21 y 24 de *Puccinia graminis tritici*. [**Reaction of a collection of wheats from the Cereal Cultivation Centre to races 14, 21 and 24 of *Puccinia graminis tritici*.**] *Bol. Inst. Invest. agron.* 1952, **12,** No. 27, 573-88, bibl. 9, illus., English summary p. 587. [Cent. Cerealicult., Madrid]

[See also *Fld Crop Abstr.* 5 : 19.]

1237 SLYKHUIS, J. T. **Wheat streak mosaic in Alberta and factors related to its spread.** *Canad. J. agric. Sci.* 1953, **33,** No. 2, 195-7, bibl. 4. [Pl. Path. Lab., Lethbridge, Alberta]

Wheat streak mosaic was found on winter and spring wheat in Alberta for the first time in 1952 and its incidence was greatest in early-sown winter wheat and late-sown spring wheat and depended on nearness to infected crops. A mite of the genus *Aceria* appears to be a vector of the virus.—P.J.B.

1238 GLYNNE, Mary D. **Wheat yield and soil-borne diseases.** *Ann. appl. Biol.* 1953, **40,** No. 1, 221-4, bibl. 1. [Rothamsted Exp. Sta., Harpenden, Herts.]

1239 ESTEVES, I. A. A anatomia do colmo de alguns trigos. Sua possível relação com a acama. [**The relationship between the stem-structure of various wheat varieties and lodging.**] *Melhoramento* 1952, **5,** 21-49, bibl. 39, illus., English summary p. 44. [Pl. Breed. Sta., Elvas, Portugal]

The history of investigations into the lodging of cereal crops is summarized. A study was made of the following three regions of the culms of 24 varieties of wheat : (a) the central portion of the basal internode, (b) the first node above the zone of tillering, (c) the basal portion of the second internode above the zone of tillering. There were marked differences, between varieties, in the size of the central cavity of the stem, in the width of the fibrous stereome surrounding the vascular bundles and in the thickness of the walls of the cells constituting the stereome. It is thought that varieties in which the stereome is highly developed are likely to resist lodging.—W.J.B.

1240 WITTENROOD, H. G. and BROEKHUIZEN, S. Onderzoek naar de kouderesistentie van verschillende tarwerassen. Resultaat van de vriesproeven in 1951. [**Research on the cold resistance of wheat varieties. Results of freezing-tests in 1951.**] *Tech. Rep. 5. Cocobro*

Inst., Wageningen 1952, 10-18, illus., bibl. 12, French summary pp. 65-7.

ow-temperature treatment (minimum tempera-
re —14°C.) was applied to 385 varieties of wheat,
ostly European, including the standard control
rieties Carsten's V, Juliana and Bersée, between
Feb. and 15 March, 1951. After the completion
the treatment, each variety was assessed for
sistance to cold according to a scale of values
presenting the damage caused to the plants of
at variety by the treatment. (0 = plant killed,
= plant undamaged). The three standard
rieties were graded in order of resistance to cold
follows : Carsten's V, 7 ; Juliana, 5 ; Bersée,
5. It was found that the nature of the natural
rdening undergone by the plants before cold-
eatment determined to some extent the resistance
the plants to low temperatures artificially
plied. Certain varieties, such as Heine II, Heine
and Hybride de Lobeau, were resistant to cold
ien tested after a period of cold weather (more
sistant than Carsten's V) but showed only poor
sistance to cold (about the same as Bersée) when
sted after a period of mild weather. Such
rieties can be expected to succumb to cold when
onset of frost is sudden. There are notes on the
actical details of the methods employed in carry-
out low-temperature tests. Full details of the
haviour of each variety during the tests are
ulated in an appendix.—W.J.B.

41 Dantuma, G. Enkele problemen, waarmede bij de bepaling van de kouderesistentie van tarwe rekening dient te worden gehouden. [**Some problems to be considered in relation to the determination of the cold resistance of wheat.**] *Tech. Rep. 5. Cocobro Inst., Wageningen* 1952, 19-21, bibl. 12, French summary pp. 67-8.

e freezing-technique used for testing the cold-
istance of wheat is discussed in relation to two
tors, the physiological development and the
gree of hardening of the plant at the time of the
t. Tests should be made when vernalization is
nplete (February) and cold resistance, therefore,
a minimum. Plants are tested at the 3-5 leaf
ge. A technique is described whereby all plants
subjected to an artificial hardening process
ore being tested, so that all plants are hardened
the same degree at the time of the test. In order
reveal the differences in the cold resistance of
eat varieties, two series of tests are necessary ;
at a very low temperature (—15°C.) to reveal
erences between very winterhardy and fairly
nterhardy varieties, and the other at a slightly
her temperature to reveal differences between
ieties with poor resistance to cold.—W.J.B.

2 Dantuma, G. Onderzoek naar de koudebehoefte van verschillende tarwerassen. Resultaat van de zaaitijdproeven 1951. [**Investigations into the cold requirement of wheat varieties. Results of the sowing-date trials, 1951.**] *Tech. Rep. 5. Cocobro Inst., Wageningen* 1952, 22-6, bibl. 12, illus., French summary p. 68.

Over 300 varieties of wheat from various parts of Europe, together with a few from North America, were tested for cold requirement, at 3 stations in the Netherlands. The cold requirement of each variety was represented by the latest date at which it could be sown without risk of a significant reduction in yield and the varieties were classified into 8 groups on this basis. Thus the varieties with the greatest cold requirement were classified as autumn varieties and those with the least cold requirement as April varieties. The results of the cold-requirement trials are tabulated in an appendix. An attempt is made to explain the fact that certain varieties were found to have different cold requirements at different stations on the basis of the interaction of climatic and physiological factors.—W.J.B.

1243 Dantuma, G. Over het verband tussen kouderesistentie en koudebehoefte. [**The relationship between cold resistance and cold requirements.**] *Tech. Rep. 5. Cocobro Inst., Wageningen* 1952, 27-9, bibl. 12, illus., French summary p. 69.

A study of a large collection of wheat varieties revealed no absolute correlation between a high degree of cold resistance and two characteristics commonly associated with it, a prostrate habit persisting into spring and a high cold requirement. Some varieties which are highly resistant to cold, among them Heine 7, have an erect habit. Other wheats, notably certain Austrian and Swiss varieties, and also the varieties Prima from Belgium, Renfort from France and Derenb. Silber from Germany, combine a low cold requirement (they can be sown as late as January or February) with a high degree of cold resistance usually associated with true winter wheats.—W.J.B.

1244 Wittenrood, H. G. Kouderesistentie en koudebehoefte in verband met de ontwikkeling van de tarweplant. [**Cold resistance and cold requirement in connexion with the development of the wheat plant.**] *Tech. Rep. 5. Cocobro Inst., Wageningen* 1952, 30-40, bibl. 12, illus., French summary pp. 69-71.

In general, a high degree of resistance to cold, a high cold requirement, slow morphological development [the scale of morphological development used (devised by W. Feekes) appears in an appendix] and a prostrate habit were associated characteristics in wheat varieties. There was, nevertheless, no absolute correlation between any of the characteristics. Certain Austrian varieties were notable in that they combined extreme resistance to cold with a very rapid rate of development in spring. It is concluded that the characteristics commonly associated with one another are not physiologically linked and that their dissociation through breeding is possible.—W.J.B.

1245 Briganti, Giovanna M. Rapporto tra la fotosintesi e la concentrazione glucidica in alcune varietà de grano. Nota preventiva. [**Relationship between photosynthesis and carbohydrate concentration in some varieties of wheat. Preliminary note.**] *Ann. Fac. Agr., Perugia* 1950, **7**, 125-8, bibl. 11. [Received 1953] [Ist. Bot., Univ. Perugia, Italy]

1246 Briganti, Giovanna M. Periodo di adattamento alla luce relativo al processo fotosintetico. [**The period of adaptation to light in the photosynthetic process.**] *Ann. Fac. Agr., Perugia* 1950, **7**, 129-33, bibl. 5. [Received 1953] [Ist. Bot., Univ. Perugia, Italy]

Trials carried out with several wheat varieties and other plants showed that in plants, after the night period darkness, there is a period of adaptation to light, during which the photosynthetic activity is reduced.—E.B.O.

1247 Vasiljeva, N. G. [**Change in the permeability of protoplasm in the cells of leaves in spring wheat under irrigation.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **88**, No. 3, 565-6, bibl. 1. [Timirjazev Inst. Pl. Physiol., Acad. Sci., USSR]

On the basis of the work of Maximov and Vasiljeva (*Trudy Timirjazev Inst. Plant Physiol.* 1949, 6, No. 1, 150) who showed that the permeability of protoplasm is an indication of the degree of drought resistance in the plant, the author has studied changes in permeability of protoplasm (evaluated by a test of electric conductivity of leaf tissue) in different varieties of spring wheats grown with and without irrigation. The work was carried out at the Kursk Zonal Experiment Station with different types of spring wheat: Lutescens 62, wheat/*Agropyron* hybrid No. 22850 and Hordeiforme 10. The control plants were grown without irrigation and the treated material was given 2 waterings on soils dried to 70% of the water-holding capacity in the 0-50 cm. layer. The watering was at a rate of 990 cu. m./ha. By means of the electric conductivity test described, it is possible to evaluate the degree of the crops' drought resistance. According to the absolute figures of specific electric conductivity of the leaf tissue (expressed in ohms), there is evidence that the permeability of protoplasm in Lutescens 62 is little affected by the environment but the other two varieties, with irrigation, exhibit an increase in the passage of electrolytes into solution compared with the control, thereby indicating that the growth conditions have been unfavourable to these less drought-resistant types.—M.H.

1248 Pinevič, V. V. [**The effect of mineral fertilizers on the quality of protein in wheat.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1952, **87**, No. 3, 501-4, bibl. 11, illus. [Leningrad State Univ.]

This work was begun in 1949 with the spring wheat *Triticum hordeiforme* 10 in order to study the extent of variation in quality of grain protein induced by potassium, calcium and phosphorus applied at the light stage of the plants' development. A total of 9 culture vessels each received specified amounts of anhydrous salts from the fertilizers KCl, NaH$_2$ PO$_4$ and CaCl$_2$, and the 10th (control vessel) received complete fertilizer. The culture vessels each contained 7 kg. of podzolic loam which had received an initial treatment (in grams) of 0.9 KCl, 1.94 NaH$_2$ PO$_4$, 1.64 CaCl$_2$ and 1.00 NH$_4$ NO$_3$. The tests showed that (with the exception of the 9th culture which received 65.6 g. CaCl$_2$) the remaining 8 treatments each produced an increase over the control in total yields, grain yields and absolute grain weight. With regard to the nitrogen of the protein fraction in grain, the amounts differed (some greater and some less than the control) in the variants of the tests and they surpassed the variations which are known to result from climatic factors. There is also evidence that the content of glutenin in the grain increases and the gliadin decreases in proportion as the amount of P in the nutrient medium increases. The claim made by Liškevič and others in *Trudy prikl. Bot.* 3, 5, 1935, that the magnitude of the ratio gliadin/glutenin is a criterion by which winter wheats can be distinguished from spring wheats is refuted by the author's results, which show that this ratio fluctuates under the effects of mineral fertilizers.—M.H.

1249 Bains, G. S. **Effect of commercial fertilizers and green manure on yield and nutritive value of wheat. 2. Nutritive value with respect to general composition, thiamine, nicotinic acid and the biological value of the protein of grain.** *Cereal Chem.* 1953, **30**, No. 2, 139-45, bibl. 22. [Punjab Agric. Coll. and Res. Inst., Lyallpur, Pakistan]

A report is given on trials in which different N, P, K and green-manure treatments were given to wheat. In all cases, N treatments were equivalent to 60 lb. N per ac. and P treatments 25 lb. P per ac. The green manure was *Cajanus indicus*, 5 tons per ac. Highest yields followed treatments with superphosphate + green manure and superphosphate +

monium sulphate + green manure. Superphos- ate, either alone, or with green manure, produced in with a low protein-content of 9.3%, compared h 10.3 to 11.5% for the other treatments. The ilability of the protein in grain with a high pro- n-content was greater than that in grain with a protein-content. Manurial treatment had no rked effect on the thiamin and nicotinic acid itent of the grain.—P.J.B.

0 Raychaudhuri, S. P. **Chemical fertilizers and soil productivity.** *Indian J. agric. Sci.* 1952, **22**, Pt. 3, 223-34, bibl. 8.

eview is made of the results of experiments in ich farmyard, green and artificial manures were olied separately or in combination to wheat and crops on various types of soil in India. Because he poor response of crops to the application of ficial nitrogenous manures on unirrigated land h a low rainfall it is suggested that these nures should be diverted to regions well supplied h water.—W.J.B.

1 Hobbs, J. A. **The effect of spring nitrogen fertilization on plant characteristics of winter wheat.** *Proc. Amer. Soc. Soil Sci.* 1953, **17**, No. 1, 39-42, bibl. 2. [Kansas Agric. Exp. Sta., Manhattan]

dies were made in Kansas during 1943-50 into effect on the growth characteristics, grain yield protein content of the grain of winter wheat eiving the following 5 treatments (lb./ac.) during umn : (a) nil, (b) 150 superphosphate, (c) 150 erphosphate + 40 of 50% sulphate of potash, 150 superphosphate, 40 sulphate of potash + of 33.5% ammonium nitrate, (e) 2.5 tons of nyard manure per ac. to plots under continuous eat. Each treatment was combined with a spring -dressing of 37 lb. N per ac., or with no spring -dressing. Yields for plots under treatments (a), (c), (d) and (e), which received no spring top- ssing, were 21.2, 23.3, 25.9, 33.5, 29.5 bu. per respectively. Plots under similar treatments, receiving N top-dressings in spring, yielded , 27.4, 30.9, 35.4 and 30.5 bu. per ac., respec- ly. There were no significant interactions be- en autumn and spring N treatments. Stubble nts averaged 127.2 (culms per 5 ft. of row) for s under all treatments receiving no N top- sing, and 146 for all plots receiving N top- sing. Except for treatment (e), plots receiving p-dressings had about 20 more culms per 5 ft. row than those receiving no top-dressing. urial treatment in autumn reduced the protein ent of the grain in all cases. N top-dressings ring significantly increased the protein content he grain. Where P was applied in autumn, eatments markedly increased grain yields, this g partly attributable to increased tillering and n increased number of grains per ear.—P.J.B.

1252 Denmark. Statens Forsøgsvirksomhed i Plantekultur. Medd. 488. Artsforsøg med hvede og rug 1945-1951. [**Species trials with wheat and rye (in Denmark), 1945-51.**] *Tidsskr. Planteavl* 1953, **56**, No. 2, 353-7.

Trials at 8 locations were carried out to compare the yields of Skandia II wheat and Petkus rye receiving 200-300 and 400-500 kg. nitrochalk per ha. On arable soils, rye receiving 200-300 kg. nitrochalk per ha. outyielded wheat by amounts ranging from 4% on good, loamy soil, to 18% on light, sandy soil. Where 400-500 kg. nitrochalk per ha. were applied, the rye variety outyielded Skandia II by a relatively small margin on clay soils and fertile sandy soils, but was considerably superior to the wheat on light sandy soils. On fen soil, the rye gave yields 30% below those of the wheat. Petkus was more winter-hardy than Skandia II and gave considerably higher yields than Skandia II following cold winters. In mild, but not in cold winters, the straw yields of Skandia II were somewhat higher than those of Petkus. The grain yields of Petkus varied less from year to year than those of Skandia II.—P.J.B.

1253 Wilbur, D. A. **Effectiveness of dusts containing piperonyl butoxide and pyrethrins in protecting wheat against insects.** *J. econ. Ent.* 1952, **45**, No. 6, 913-20, bibl. 3. [Kansas Agric. Exp. Sta.]

An account is given of trials in controlling insects in stored wheat from the 1950 and 1951 harvests.—E.B.O.

OATS

1254 Paauw, F. van der. Aanpassing en schade van het gewas haver bij watergebrek. [**The damage to oats caused by drought and the adaptation of the crop to moisture deficiencies.**] *Comm. Hydrol. Res. T.N.O. Proc. Tech. Meet. 1946-50* The Hague, 1952, 202-5, illus., English summary pp. 294-5, French summary pp. 324-5.

The influence of the duration of periods of drought and the time of their occurrence (in relation to the stage of plant growth) on the yield of grain, grain weight, number of grains per panicle, number of stalks per plant, height of plants and water-absorbing capacity of the roots of oat plants, was studied. The greatest reduction in yield was caused by droughts occurring during the period of the emergence of panicles and during flowering. Drought occurring in the early stages of plant growth killed off the least vigorous lateral shoots. Drought during flowering reduced the number of grains per panicle. Late droughts reduced the size of grain. The adaptation of the oat plant to conditions of moisture deficiency is discussed.—W.J.B.

1255† Ferrari, T. J. **The accuracy of yields of grassland and oats evaluated by eye estimates.** *Neth. J. agric. Sci.* 1953, **1**, No. 2, 88-95, bibl. 15, illus.

1256 Northern Ireland. Monthly report of the Ministry of Agriculture. **Oat variety trials.** *Mon. Rep. Minist. Agric. N. Ire.* 1953, **28,** No. 1, 12-14.

Results are given of two series of oat variety trials carried out in County Tyrone in 1952. One series was grown on soils of medium to high fertility and the other on higher-lying soils of low fertility. Of the first-named series, the varieties S.84, Glasnevin Triumph and Stormont Arrow gave significantly higher yields than 4 other varieties of more recent introduction. Of the last-named series, Stormont Kern and Stormont Grandee were the most suitable high-yielding varieties of the 5 tested.—m.a.

1257 Åkerman, Å. Svalöfs Blendahavre. [**Svalof's Blenda oats.**] *Årsb. Alm. Svenska Utsädesaktiebol., Svalöf* 1952, 2-3.

A brief report is given of varietal trials with Blenda oats during 1949-50 in Sweden. In a large number of trials carried out by the Swedish Seed Association, Blenda outyielded Sol II and Guldregn II by 1.8 and 4.3%, respectively. In 268 local trials, Blenda outyielded Sol II and Guldregn II by 3.6 and 6.7%, respectively. In other local trials, Blenda outyielded Trio by 9.3% and Bambu II by 8.6%.—p.j.b.

1258 Buchli, M. Die Hafersorten des schweizerischen Richtsortimentes für den Getreidebau 1953. [**Swiss oat varieties for 1953 planting.**] *Mitt. Schweiz. Landw.* 1953, **1**, No. 7, 103-8, illus.

A morphological description of 10 oat varieties is given, together with such characteristics as straw stiffness and resistance to frit-fly attack.—m.a.

1259 Hutchinson, J. B. and others. **The kernel content of oats. Variation in percentage kernel content and 1,000 kernel weight within the variety.** *J. nat. Inst. agric. Bot.* 1952, **6,** No. 2, 149-60, bibl. 7, illus.

The variations in kernel content and weight found among 233 English and Scottish samples of Victory oats from the harvests of 1946-51 were investigated. Kernel content is usually regarded as a varietal characteristic but the assignment of an average value to each variety is difficult, as, among the various sources of variation listed, differences of environment, even within one season, caused differences of kernel content among samples of the same variety which were almost as great as those reported between extreme varieties.—c.l.s.

1260 Finker, R. E. and others. **Reaction of oa varieties to powdery mildew.** *Agron. J.* 1953 **45,** No. 3, 92-5, bibl. 6, illus. [Iowa Agric Exp. Sta., Ames]

In pot trials in Iowa, 4289 varieties and selection of oats were tested for their resistance to *Erysiph graminis*. No strain was wholly immune. Tw strains were very resistant. These were : Sandhafer, a 7 chromosome variety of *Avena strigosa*, and Missouri 04015, a selection of *A. sativa*. strains were moderately resistant, namely : Rec Rustproof × Victoria-Richland, White Mildew Resistant (Welsh), Missouri 0-205 and Neosho × Landhafer.—p.j.b.

1261 Vergnano, O. and Hunter, G. J. **Nickel and cobalt toxicities in oat plants.** *Ann. Bot., Lond.* 1953, **17,** No. 66, 317-27, bibl. 25. [Macaulay Inst. Soil Res., Aberdeen]

The types of symptoms and anatomical changes produced in oat plants by the addition of nickel and of cobalt to nutrient solution, or by iron deficiency, have been compared with those occurring in oat plants from several areas of Aberdeenshire and shown to be similar. Nickel contents are comparable whilst the cobalt content of the sand-culture plants is considerably higher.—Authors' abstract.

1262 McCoy, T. A. and others. **The relation of the amino acid composition to the development of oats.** *Pl. Physiol.* 1953, **28,** No. 1, 77-88, bibl. 20, illus. [Samuel Roberts Noble Foundation, Ardmore, Okla.]

Wintok Oats C1-3424, were grown under 8 hr. and 16 hr. photoperiods in such a manner that plants of the same chronological age would vary in physiological age from the purely vegetative stage to maturity. The plants were harvested and separated into leaves, roots, stems, and fruits. These were analyzed for fifteen amino acids. Data are given of amino-acid contents of roots, leaves, stems, fruits and tops of oats.—m.a.

1263 Williams, J. H. **Crop variety response to exogenous growth regulators 2. Inheritance of differential response in corn [maize] and oats.** *Iowa State Coll. J. Sci.* 1953, **27,** No. 2, 278-9.

Applications of 0.5 and 1 lb. per ac. of 2,4-D acid and 2 and 4 lb. per ac. of IPC were made to 13 varieties of oats at 3 different dates during the period of floral primordia initiation and at anthesis. In 2-years' studies, all rates and dates of herbicidal treatment reduced grain yields compared with untreated controls, the yield reduction being greatest following 2,4-D treatment during the initiation of floral primordia. Reductions in kernel numbers per spikelet and spikelet numbers per panicle were closely correlated with yield de-eases. The greatest reductions in spikelet num- rs were caused by treatments given when anch initials were in process of differentiation, ile the greatest reductions in kernel numbers ere caused in all varieties by treatments given ien the terminal floret primordia had differen- ted and also, in most varieties, when additional ikelets had differentiated. IPC caused the eatest yield reductions following treatment at thesis. Varietal response to 2,4-D, but not to 'C, was noted. Mindo and Cherokee oats were nsiderably more susceptible to 2,4-D than were ndrew and Shelby.—P.J.B.

64 OLESEN, J. Kobber—et nødvendigt plantenaeringsstof. [**Copper—a necessary plant nutrient.**] *Dansk Landbr.* 1953, **72,** No. 11, 134-5.

otes are given on a number of trials in Denmark rried out to determine the effect of applications of ı on the yields of oats and barley on different ls. On sandy humus soils, the application of 50 . per ha. of $CuSO_4$ resulted in increases of 6 hkg. r ha. in the grain yields of both oats and barley, mpared with untreated controls. In over 100 als on sandy soils, respective grain yield in- eases of oats and barley were 4 and 2.9 hkg. per ., while on loam and clay soils, increases were and 2 hkg. per ha. over controls. Trials made to d the best rate of application of $CuSo_4$ gave riable results, but it was concluded that 50 kg. r ha. was the most satisfactory.—P.J.B.

E

55 DENMARK. Statens Forsøgsvirksomhed i Plantekultur. Medd. 467. Forsøg med rugsorter 1946-1951. [**Varietal trials with rye (in Denmark), 1946-51.**] *Tidsskr. Planteavl* 1953, **56,** No. 2, 317-33.

is paper gives a comprehensive report of the als summarized in Medd. 476, for which, see s. 523.—P.J.B.

56 DENMARK. Statens Forsøgsvirksomhed i Plantekultur. Medd. No. 492. Forsøg med tetraploid rug 1950-1952. Foreløbig meddelelse. [**Trials with tetraploid rye, 1950-2. Provisional report.**] *Tidsskr. Planteavl* 1953, **56,** No. 3, 537-9.

e results are given of trials in Denmark at 4 ations in which Skandia wheat was compared h diploid Petkus rye and with tetraploid Stål l Petkus rye. In 11 trials, diploid Petkus rye yielded Skandia wheat by 6.8 hkg. per ha., ile tetraploid Stål rye outyielded Skandia by hkg. per ha. In 7 trials, diploid Petkus out- lded Skandia wheat by 10.1 hkg. per ha., while andia outyielded tetraploid Stål and Petkus by 1.3 and 2.6 hkg. per ha., respectively. Though straw length was the same, the tetraploid ryes were inferior to diploid Petkus in respect of straw yields. The tetraploid Petkus was considerably more stiff-strawed than tetraploid Stål, or diploid Petkus. —P.J.B.

1267 HAGBERG, A. Kärnansatsen hos Dubbelstålråg vid odling i grannskap av diploid råg. [**Seed-setting in Double Stål rye (tetraploid) grown closely adjacent to diploid rye.**] *Sverig. Utsädesfören. Tidskr.* 1953, **63,** No. 1, 63-9, bibl. 3, English summary p. 69.

In trials at Ugerup, Sweden, in 1951, a square plot of tetraploid Stål rye, 0.5 ha. in area, was surrounded with diploid Stål rye. Omitting the tetraploid rows immediately adjacent to the diploid plants, the average grain yield of the tetraploid plants was about 20% lower than that of isolated tetraploid plants grown elsewhere. Mean yields for the tetraploid and diploid plants were 2200 and 3000 kg. per ha., compared with 4200 and 4000 kg. per ha. for tetraploid and diploid crops grown in isolation. The decrease in the yield of different parts of the tetraploid plot clearly showed the influence of the south-westerly wind prevailing at the time of flowering. Seed-setting on the south-western corner of the plot averaged only 10%. Diploid plants adjacent to tetraploid plants also suffered severely from pollination with tetraploid pollen. Points at 6 to 7 m. from the edge of the tetraploid plot had plants whose seed-setting did not differ significantly from the average of the whole plot, illustrating the blanketing effect of the diploid pollen on the tetraploid plot.—P.J.B.

1268 SISAKJAN, N. M. and FILIPPOVIČ, I. I. [**The character of metabolism in relation to stage of development of the organism.**] [Russian] *Ž. obščeĭ Biol.* (*J. gen. Biol.*) 1953, **14,** No. 3, 215-28, bibl. 34, illus.

This study is concerned with physiological and biochemical processes in relation to phasic development of rye, barley and wheat plants.—M.H.

1269 PURVIS, O. N. and GREGORY, F. C. **Accelerating effect of an extract of vernalized embryos of winter rye on flower initiation in unvernalized embryos.** *Nature, Lond.* 1953, **171,** No. 4355, 687-8.—M.H.

Experiments carried out in 2 years are reported. In 1951 embryos were removed from rye grain which had been vernalized for 10 weeks and extracted with water, chloroform, ethanol and ether. The extracts, after removal of the solvents, were added to a sucrose agar medium, on which excised, unvernalized embryos were grown for 6 days. A control series received no extract. After treatment the seedlings were grown on, in sand culture. The only extract which led to a significant hastening of flowering was that in chloroform. In 1952 therefore a further experiment was performed using only chloroform. A range of concentrations was used containing extracts from 0 to 10 vernalized embryos, and a control extract from unvernalized embryos was included. Higher concentrations only had an accelerating effect, which was statistically highly significant. The extract of unvernalized embryos was without effect proving that the chloroform itself, or some other extracted constituent of the embryo, was without effect. The acceleration of flowering achieved was equivalent to that of nearly 3 weeks of low temperature treatment.—F. G. Gregory.

BARLEY

1270 Teshima, S. and Katô, J. **A study on the extension of double-crop farming technique for paddy fields in Tohoku region.** *Rep. Inst. agric. Res. Tohoku Univ.* 1950, **1-2,** 123-36. [Received 1953]

An analysis is made of the different factors influencing the cultivation of barley on paddy fields in the Tohoku region with special reference to the labour economy.—M.A.

1271 Northern Ireland. Monthly Report of the Ministry of Agriculture. **Barley variety trials.** *Mon. Rep. Minist. Agric. N. Ire.* 1953, **28,** No. 1, 14-15.

Of 6 varieties tested in a single trial in 1952, Ymer gave the highest yields.—M.A.

1272 Denmark. Statens Forsøgsvirksomhed i Plantekultur. Medd. No. 494. Forsøg med byggsorter. [**Varietal trials with barley.**] *Tidsskr. Planteavl* 1953, **56,** No. 3, 541-4.

The results are given of trials at 11 locations in Denmark with 6 varieties of barley during 1949-52, 2 varieties during 1951-2 and 1 variety in 1952. Mean yields during 1949-52 for Svaløf's Ymer, Carlsberg, Abed Maja, Svaløf's Heimdal, Weibull's Herta and Øtofte Fero were 42.1, 41.9, 41.6, 41.1, 40.4, and 39.8 hkg. per ha., respectively. Yields during 1951-2 for Svaløf's Bonus and Pajbjerg Drost were 42.7 and 42.0 hkg., respectively, and 40.9 hkg. per ha. in 1952 for Weibull's Rika. Weibull's Herta and Rika were very stiff in the straw, while Øtofte Fero was the least stiff-strawed variety. Straw yields were very high for Fero and Drost (44.2 and 43.7 hkg. per ha., respectively), while Svaløf's Ymer had the lowest straw yield (40.5 hkg. per ha.). Brief notes are given on each variety.—P.J.B.

1273 Eliasson, S. and Jacobson, G. Sortförsök med korn. Sammanställning av resultaten av de av Statens Jordbruksförsök ledda sortförsöken med korn under åren 194 (1934)-1950. [**Varietal trials with barley. Summary of the results of trials laid down by the State Agricultural Research Station (Sweden) during 1940 (1934)-1950.**] *Medd. 41. Statens Jordbrförsök.* 1952, pp. 130, bibl 159.

The results are reported of varietal trials carried out in the 14 main agricultural regions of Sweden with 2-row and 6-row barley varieties. The varieties used were the following : the 2-row Svaløf varieties Gull, Brage, Svanhals, Primus II, Opal B, Freja, Ymer, Bonus and Heimdal, the 6-row Svaløf varieties Vega, Dore, Stella, Edda, Edda II, Asa and J 131 K, the 2-row Weibull varieties Puke II, Balder, Stallar, 4468, Herta, 4933, Rika, Stallar II, 5113 and 54-36 and the following other 2-row varieties : Selecta, Kenia, Maja, Rigel, Carlsberg, Lenta and Kron and the 6-row varieties Asplund, Netto and Tammi. A diagram is given of the origins and mutual hereditary relationships of these varieties. Observations on date of maturation, straw strength, hectolitre weight, 1000-grain weight and crude-protein content of the grain are also given.—P.J.B.

1274 Fröier, K. Maltkorn och foderkorn. [**Malting barley and feeding barley (in Sweden**). *Årsb. Alm. Svenska Utsädesaktiebol.* 1952, 3-6.

The present status of malting barley production in Sweden is discussed, with particular reference to suitable varieties. In 5-years' studies of the malting quality of different varieties in south Sweden, Svaløf's Heimdal was best and represented a considerable advance on Kenia in this respect. In comparative trials at a number of locations, Heimdal averaged 3% higher grain yields than Kenia, but yielded less than the best feeding barleys, such as Bonus and Weibull's Herta, which gave yields 2 and 4% higher than Heimdal.—P.J.B.

1275 Løvø, P. J. Forsøk med byggsorter på Statens Forsøksgard Voll og på gårdsfelter i Møre og Romsdal og i Trøndelag 1935-50 [**Experiments (in Norway) with barley varieties at the Voll State Experiment Station and local trials with barley in Møre og Romsdal and in Trøndelag.**] *Forskn. Fors. Landbr.* 1952, **3,** No. 3, 171-208, bibl. 15. English summary pp. 207-8. [Statens Forsøksgard Voll., Trøndelag, Norway]

The results are given of 2 series of varietal trials with 6-row barleys, one varietal trial with 2-row barleys and trials with different 2-row and 6-row varieties as companion crops for herbage species. Among the 6-row varieties, Fraeg gave the highest yields, but was liable to lodge and was somewhat late in maturing ; Herse and Varde followed Fraeg in yield, were stiff-strawed and earlier in aturing than Fraeg. Asplund was as late in aturing as Fraeg and yielded less than Herse and arde. Maskin followed Asplund in terms of yield, it was early in maturing. Gjølme, a Trøndelag ariety, was inferior to all the above varieties. raeg was not particularly demanding in respect warmth, but did not tolerate heavy rainfall well. arde, Asplund and Gjølme required a higher mperature during the growing season than did erse and Maskin. In comparisons between 6-row id 2-row varieties, on soils in good heart and of gh fertility, the 2-row varieties outyielded the row varieties. This tendency reversed itself on ils in poor condition and under unfavourable matic conditions. The 2-row varieties averaged to 3 weeks later in maturity than the 6-row rieties ; also, the 2-row varieties tolerated cessive rainfall in the last part of the growing ason less well than the 6-row varieties. In order yield among 2-row varieties, Domen was best, lowed by Ymer, Goliat, Freja, Maja, Opal B and enia. Domen was very stiff-strawed. Maja and ner were moderately stiff-strawed, while Goliat, pal B and Freja were the worst in this respect. companion crops for herbage seeds, Maskin and rde were best ; and the 2-row varieties were ferior to the 6-row varieties. Herse and Varde recommended for most conditions in the trial trict, with Maskin recommended for high, posed locations. Among 2-row varieties, Domen, ner and Maja are recommended. Notes are given each variety.—P.J.B.

76 DEN HARTOG, G. T. and LAMBERT, J. W. **The relationships between certain agronomic and malting quality characters of barley.** *Agron. J.* 1953, **45,** No. 5, 208-12, bibl. 7. [Agron. Div., Univ. Minnesota, St. Paul]

idies are reported on correlations between fferent agronomic and malting characters in 10 rley crosses in which Mars was used as one rent in each case. Average kernel-weight, neral fertility of the florets, bushel-weight and ract were positively correlated with yield, while tein content of the grain and diastatic power re negatively correlated with yield. There was a hly significant simple positive correlation ween protein content and diastatic power and hly significant simple negative correlations be- een protein content and extract and between static power and extract. There was evidence to w the value of protein content as an index of lting quality, not only by virtue of its own value a character, but also because of its correlation h diastatic power and extract.—P.J.B.

7 YAMAMOTO, K. **Investigation on " viviparous " germination of seed in barley varieties in Japan.** *Rep. Inst. agric. Res. Tohoku Univ.* 1951, **3,** 13-27, bibl. 19, illus. [Received 1953]

An investigation into viviparous germination among 190 strains of barley showed that 14 classes displayed different capacities for viviparous germination. It was shown that, provided the embryo was ripe, germination could begin within 10 days of fertilization. The seeds of the Sangatsu-mugi variety germinated best when their embryos were exposed to the atmosphere by the removal of all or part of the seed other than the embryo. Both stripped and unstripped seed, when germinated in distilled water to which H_2O_2 had been added, gave higher germination percentages than when germinated in distilled water alone. The ability to germinate viviparously appeared to depend on the varietal characteristics of the seed-coat and of the embryo in relation to the oxygen permeability of the seed coat and the oxygen requirements of the embryo.—M.A.

1278 RUSSELL, R. S. and MARTIN, R. P. **A study of the absorption and utilization of phosphate by young barley plants. 1. The effect of external concentration on the distribution of absorbed phosphate between roots and shoots.** *J. exp. Bot.* 1953, **4,** No. 10, 108-27, bibl. 24. [Dep. Agric., Univ. Oxford]

The effect of the external concentration on the distribution of phosphate absorbed by young barley plants was studied in experimental periods varying from 1 hour to 7 days. The experiments were carried out in water culture with radioactive phosphorus as a tracer. The concentration of labelled phosphorus supplied to the plants ranged from 0.0003 to over 30 ppm. P. When the external concentration of phosphate is reduced below 10 ppm. P, the proportion of the absorbed phosphate found in the shoots is markedly reduced. Plants which have been treated with low concentrations of phosphate lose recently absorbed phosphate to the outer medium when transferred to phosphate-free solutions. Plants treated with higher concentrations lose a smaller proportion of recently absorbed phosphate. Different balances of other nutrients do not affect the general relationship between the absorption and distribution of phosphate, though quantitative changes occur. It is concluded that the retention of phosphate in the roots induced by dilute media is a direct consequence of the small quantity of phosphate entering the roots and is not attributable to the effects of other ions which may be simultaneously absorbed.—Authors' summary.

1279 TANADA, T. **Effect of oxygen concentration on the sensitivity of barley seedlings to gamma rays.** *Amer. J. Bot.* 1952, **39,** No. 10, 705-6, bibl. 11, illus.

Barley seedlings were irradiated with gamma rays from radioactive cobalt under oxygen concentrations varying from 0-100%. The inhibitory effect of the ionizing radiation on growth of roots was found to increase with increasing oxygen tension up to about 2% oxygen in nitrogen. From 2 to 100% oxygen the inhibition increased only slightly. —Author's summary.

1280 Frey, K. J. and Robertson, L. S. **The effect of fertilizer application and analysis on certain criteria of malting quality in barley.** *Cereal Chem.* 1953, **30,** No. 1, 31-9, bibl. 9. [Mich. Agric. Exp. Sta., East Lansing]

Two-years' studies in Michigan are reported on the effect of different types of NPK manure applied at a rate of 500 lb. per ac. to Bay, Wisconsin 38, Montcalm, Moore and O.A.C. 21 malting barleys. Respective average increases in malt extract of all varieties were 0.9 and 0.4% in 1949 and 1950. No manurial treatment appreciably altered the protein content of the grain. In 1949, but not in 1950, manurial treatment increased the diastatic power of the grain. It was concluded that in the humid conditions of Michigan, manurial treatment up to the rates used in these trials would not lead to a reduction in malting quality of barley, and would improve quality in certain respects.—P.J.B.

MAIZE

1281 Montanari, V. La coltivazione dei mais ibridi nel compartimento agrario delle Venezie: risultati conseguiti e possibilità future. [**Hybrid maize growing in the agricultural department of the Venezie (Italy): Results achieved and future possibilities.**] *Agricoltura d. Venezie* 1953, **7,** No. 2, 59-80, bibl. in text, illus.

1282 Weijer, J. **A catalogue of genetic maize types together with a maize bibliography.** *Bibliogr. genet.* 1952. **14,** No. 3-4, 189-425, bibl. 3850. [Genet. Inst. Rijksuniv., Haren, Groningen, Netherlands]

1283 Jugenheimer, R. W. and others. **Results of co-operative hybrid maize tests in European and Mediterranean countries, 1950. A progress report.** *FAO Devel. Pap. No.* 31 1952, pp. 43.

A report is given of the results of trials with American hybrid maize varieties with relative maturity ratings ranging from 70 to 130/134 days, in 21 countries in Europe and the Mediterranean region. Data are given on days from sowing to maturity of the varieties in the different countries, together with their grain yields.—P.J.B.

1284 Crane, P. L. and others. **Performance of corn [maize] hybrids in Indiana through 1952.** *Sta. Circ. 389. Purdue agric. Exp. Sta.* 1952, pp. 32.

1285 Huber, L. L. and Schaaf, H. M. **Drought tolerant corn hybrids promise higher yields in Pennsylvania.** Suppl. *Bull. 553. Pennsylvania State Coll. agric. Exp. Sta.* 1953, 3-4, illus.

High plant-stand densities have accentuated the drought problem in maize growing in the USA. Notes are given on the performance of a number of maize hybrids grown in Pennsylvania, which showed that it was possible to breed for drought resistance. Drought tolerance was also thought to be linked to resistance to corn-borer [*Pyrausta nubilalis*] damage.—P.J.B.

1286† Galinat, W. C. and Andrew, R. H. **Stolon-producing corn.** *Agron. J.* 1953, **45,** No. 3, 122-3, illus. [Agron. Dep., Univ. Wisconsin, Madison]

A brief note is given on corn grass, a macromutant of maize which produces abundant decumbent tillers, which root adventitiously.—P.J.B.

1287 Mes, Margaretha G. **On possible cultural methods of speeding up breeding experiments with maize. 1. The influence of length of day, night temperature and vernalization on flowering.** *S. Afr. J. Sci.* 1953, **49,** No. 7, 221-4, bibl. 3. [Pl. Physiol. Res. Inst., Pretoria Univ.]

Potchefstroom Pearl maize plants were grown in a greenhouse for 8.5 hr. during the day from April to August 1951. During the other 15.5 hr. they were subjected to either short- or long-days and to night temperatures varying from 45° - 70°F. Short days of 8.5 hr. when combined with a night temperature of 45-50°F. considerably decreased vegetative growth and delayed flowering. Longer days of 16 hr. with higher night temperatures were most favourable for vegetative growth. Neither higher temperatures nor increase in day lengths, as such, influenced the time of flowering; but silking was delayed. Potchefstroom Pearl maize is not, therefore, a short-day plant. None of the vernalization treatments had any significant effect on the onset of flowering.—From author's summary.

1288 Mes, Margaretha G. **On possible cultural methods of speeding up breeding experiments with maize. 2. The use of immature seed.** *S. Afr. J. Sci.* 1953, **49,** No. 10, 303-7, bibl. 6. [Pl. Physiol. Res. Inst. Pretoria Univ.]

Immature grains of Potchefstroom Pearl maize with a water content between 82% and 46% were harvested at the end of December 1951. In laboratory tests 100% germination was obtained thin five days from all seeds which had a water ntent below 68% at the time of harvest and ich had then been air dried for about a week. If eds were first germinated and then planted in l, satisfactory plants developed from seeds with original water content of up to 82% When mature seeds were sown directly in soil, seeds h an original water content of 58% or lower, owed germination of 90-100% and produced nts similar in size, in time of flowering and in ld to control plants developed from fully mature ds. A water content of 58% was attained about weeks after silking. The seeds were then a little er than those normally preferred for eating off cob. For breeding purposes, therefore, two erations of maize can be grown in one season by ng immature seeds harvested at the end of ember from the first crop and using these to rt the second generation at the beginning of uary. Cobs from such a second generation were vested in April 1952.—From author's summary. is work is of particular significance to producers seed maize in Britain, and other temperate ions, where maize ripens imperfectly, or not at —Ed.]

9 CHIANG, H. C. and CUTKOMP, L. K. **The importance of some biological characteristics of European corn borer on timing of application of insecticides.** *J. econ. Ent.* 1953, **46,** No. 2, 277-87, bibl. 6. [Minnesota Agric. Exp. Sta., St. Paul]

is article is concerned with the control of *austa nubilalis* on maize.—E.B.O.

0 BRETT, C. H. **Southern cornstalk borer control with Methoxychlor, DDT, Isodrin and Endrin.** *J. econ. Ent.* 1953, **46,** No. 1, 176. [North Carolina Agric. Exp. Sta., Raleigh]

drin at the rate of 0.5 lb. per acre gave the best trol of the southern cornstalk borer, *Diatraea mbidoides*, on maize but, from the standpoint of nt development, 0.12 lb. of Endrin per acre was most satisfactory treatment.—E.B.O.

1 RAFFENSPERGER, E. M. and RUTSCHKY, C. W. **A comparison of ovicides against corn earworm eggs.** *J. econ. Ent.* 1953, **46,** No. 1, 100-2, bibl. 3. [Pennsylvania State Coll.]

he 3 materials tested, Metacide is considered to vorthy of further consideration for the control orn earworm [*Heliothis armigera*] on maize.— n authors' summary.

2 COX, H. C. and LILLY, J. H. **Chemical control of the corn rootworm,** [*Diabrotica longicornis*]. *J. econ. Ent.* 1953, **46,** No. 2, 217-24, bibl. 6. [Iowa Agric. Exp. Sta., Ames]

1293 DECKER, G. C. and others. **Spraying the margins of fields as a substitute for barrier construction in chinch bug control.** *J. econ. Ent.* 1953, **46,** No. 2, 316-20, bibl. 6, illus. [Illinois Agric. Exp. Sta.]

This article is concerned with the control of *Blissus leucopterus* on maize and wheat.—E.B.O.

1294 MELSTED, S. W. **Some observed calcium deficiencies in corn under field conditions.** *Proc. Amer. Soc. Soil Sci.* 1953, **17,** No. 1, 52-4, bibl. 3, illus. [Agron. Dep., Univ. Illinois, Urbana]

Notes are given on Ca-deficiency symptoms in maize grown on silt-loam soils with pH values of less than 4.5 and with a content of less than 2 milliequivalents exchangeable Ca per 100 g. of soil. It is interesting to note that the soil Ca deficiency did not become evident until all the other nutrient deficiencies had been corrected through large applications of soluble N, P and K. Plants with Ca-deficiency symptoms contained less than 0.2% Ca. —P.J.B.

1295 RABIDEAU, G. S. and MERICLE, L. W. **The distribution of C^{14} in the root and shoot apices of young corn** [**maize**] **plants.** *Pl. Physiol.* 1953, **28,** No. 2, 329-33, bibl. 6, illus. [Pl. Res. Inst., Univ. Texas, Austin, Texas]

1296 MARRÈ, E. and MURNEEK, A. E. **The effects of fertilization** [**of ovaries**] **and growth-regulating substances (hormones) on carbohydrate and hexose-phosphate metabolism during the early stages of growth of corn** [**maize**] **kernels (fruit).** *Science* 1953, **117,** No. 3050, 661-3, bibl. 10. [Univ. Missouri, Columbia]

1297 BRIEGER, F. G. **The structure of the maize inflorescence.** *Bull. 10. Esc. Agric. "Queiroz"* 1952, pp. 44, bibl. 28, illus. [Piracicaba, Brazil]

1298 NIELSEN, K. F. **Influence of alfalfa green manure on the availability of phosphorus to corn.** *Proc. Amer. Soc. Soil Sci.* 1953, **17,** No. 1, 46-9, bibl. 16. [Ohio Agric. Exp. Sta., Wooster]

In pot studies, the availability to maize plants of P from lucerne incorporated in the soil was less than that from soil applications of KH_2PO_4, though the total recovery of P by maize plants from soil containing lucerne residues was greater than that from soils containing KH_2PO_4, indicating that the presence of lucerne residues increased the availability of P residues in the soil. Neubauer tests showed that, in these trials, the period of greatest availability of P from the lucerne residues lay between 46 and 64 days after their incorporation in the soil.—P.J.B.

1299 HUELSEN, W. A. and THOMPSON, A. E. **Artificial drying of popcorn in relation to popping expansion.** *Proc. Amer. Soc. hort. Sci.* 1952, **60,** 341-50, bibl. 11. [Univ. Illinois, Urbana]

SWEET CORN

1300 DOLAN, D. D. and CHRISTOPHER, E. P. **Plant spacing of sweet corn.** *Bull. 316. Rhode Island agric. Exp. Sta.* 1952, pp. 26, bibl. 18, illus.

The studies reported were made in Rhode Island to determine the relative importance of the rate of manuring and variety in deciding the most desirable spacing in the row between plants in rows 3 ft. apart. Two varieties were used: Early Golden, which has a husked-ear weight of 0.4 lb., a height of 3 ft. 9 in. to the base of the tassel and requires 77 days to mature; and Golden Cross Bantam, which requires 92 days to mature, has a husked-ear weight of 0.6 lb. and a height of 6 ft. to the base of the tassel. Manurial treatments applied included 400, 800 and 1200 lb. per ac. of 5-10-10 (NPK), plus 75, 150 and 225 lb. per ac. respectively, of ammonium nitrate as a side dressing. Mean ear-yields of plants grown at 4, 8 and 12 in. spacing in the row were 5.85, 5.49 and 4.52 tons per ac., ear-numbers per ac. were 2383, 1874 and 1484 dozens, with ear-weights of 6.62, 7.82 and 8.1 oz., respectively. Early Golden was better adapted to close spacing than Golden Cross Bantam. In favourable growing conditions, the ear-weights of plants growing 4 in. apart in the row were only slightly lower than those growing 8 in. apart. With low rainfall in May and June, 4 in. spacing resulted in markedly lower ear-weights than 8 in. spacing. The lowest rate of manurial treatment increased ear-yields, compared with where no treatment was made. The 800 and 1200 lb. per ac. rates did not significantly increase yields over the 400 lb. per ac. rate on the relatively fertile soil used.—P.J.B.

1301 ANDREW, R. H. **The influence of depth of planting and temperature upon stand and seedling vigor of sweet corn strains.** *Agron. J.* 1953, **45,** No. 1, 32-5, bibl. 7. [Wisconsin Agric. Exp. Sta., Madison]

Sweet corn seed was sown in flats at depths of 1 and 4 in. Germination was initiated at 70°F. The seed was then exposed to the following 3 treatments: (a) held at 65°F., (b) held at 50°F. for 5 days, followed by 70°F., (c) held at 50°F. for 10 days, followed by 70°F. Germination counts were taken when the seedlings reached a height of 4 in. Series (a) had an average germination of 91%; there was
little difference between the two sowing depth
used. The germination of series (b) averaged 7 an
8% below that of series (a) for the 1 and 4 in
sowing depths, respectively. Germination in serie
(c) was 83% for seed sown 1 in. deep, but only 49
for seed sown 4 in. deep. The cause of poor stand
following deep sowing was apparently due to
number of factors, including delay in the forma
tion of permanent roots near the coleoptile node
the increased chance of disease incidence resultin
from the long time taken to emerge, and the effec
of deep sowing in causing early loss of the absorp
tive capacity of the temporary roots before th
production of permanent roots. An inherent lack o
ability to elongate the first internode was respon
sible for poor stands in one inbred line tested.—
P.J.B.

1302 EDEN, W. G. **DDT for earworm control in sweet corn.** *J. econ. Ent.* 1953, **46,** No. 2 359-60, bibl. 7. [Alabama Polytech. Inst. Auburn]

This article is concerned with the control of th
earworm *Heliothis armigera*.—E.B.O.

MILLET AND SORGHUM

1303 SELLSCHOP, J. and GROBBELAAR, W. **Pro duction of broom-corn or broom-fibre.** *Fm in S. Afr.* 1953, **28,** No. 326, 153-4, bibl. 3 illus. [Coll. Agric., Potchefstroom]

A description of the broom-corn plant (*Sorghum*
dochna var. *technicum*) is given, together with
methods of cultivation, harvesting and fibre pre
paration.—M.A.

1304 SKERMAN, P. J. **Some agricultural features of the central highland region of Queensland.** *Qd agric. J.* 1953, **76,** Pt. 3 and 4, 139-4 and 187-201, illus.

The relationship of frost and sorghum growing i
discussed and the risks attendant on sorghum
growing in the Central Highlands outlined. Result
from experimental plantings of sorghum at Peak
Downs are given. In a sorghum variety trial there
Hermitage selection gave the highest significant
yield out of 5 of the varieties tested. A sowing
rate of 9.5 lb. per acre of the variety Kalo, gave
increased yields over rates of 7.7 and 5.6 lb., and
overall, narrow spacing and high seed rates were
better than combinations of wider spacing and
lower seed rates. The results indicate that overal
germination percentage as indicated by the plant
stand at harvest was only 20% under good sowing
conditions with certified seed and under standar
trial conditions.—M.A.

1305 ANDERSEN, Alice M. **Cause of reddening o roots and effect of fungi on sorghum seed**

lings. *Proc. Ass. Off. Seed Anal. N. Amer.* 1952, 117-31, bibl. 10, illus. [Seed Act Div., Grain Branch Prod. and Mktng Admin., U.S. Dep. Agric., Washington, D.C.]

udies on sorghum seedlings showed that the
ldening of roots and stems up to the first inter-
de was due to the presence of natural pigments.
germinating sorghum seed in sterilized sand or
l, a much better evaluation of seedling vigour
s obtained than by germinating the seed be-
een blotters. This was because of the difficulties
assessment caused by fungal infection in the
e of the blotter method.—P.J.B.

ICE

06 Morrison, S. R. **Rice irrigation experiments at the Beaumont Station in 1952.** *Rice J.* 1953, **56,** No. 4, 27. [Rice-Past. Exp. Sta., Beaumont, Texas]

e results are given of trials in Texas during 1952
determine the effect of different watering prac-
es on the yield of Bluebonnet 50 rice. Six treat-
nts were used : (a) no irrigation after germina-
n, (b) soil kept moist, but not flooded, (c) plots
ered with 2 in. of water and drained once, (d)
for (c), but 5 in. of water, (e) as for (c), but 8 in.
water (f) plots covered with 5 in. of water, but
drained. Plots (c) to (f) were flooded at 17 days
er sowing and plots (c), (d) and (e) were drained
days after sowing and reflooded 17 days later.
in yields for plots (a), (b), (c), (d), (e) and (f)
e nil, 5.9, 24, 24.3, 25.7 and 17.4 barrels per ac.,
pectively. From these results, it is concluded
t flooding during at least a part of the season is
essary, that the depth of water is not important
ere weeds are no problem and that draining
e during the season considerably increases
ds compared with where no draining is done.—
. B.

37 Farwell, G. **Rice in North Australia.** *World Crops* 1953, **5**, No. 6, 228-31, illus.

brief review is given of the actualities and
entialities of N. Australia for growing rice.—
.

38 Graham, T. G. and Littler, J. W. **Upland rice growing in Queensland.** *Qd agric. J.* 1953, **76,** Pt. 3, 125-38, illus.

results from trials begun in 1946 on rice var-
es imported from India, Ceylon, USA and New
th Wales and a description of the most promis-
varieties are briefly given.—M.A.

3 Calma, V. C. and Gantioqui, L. L. **The performance of four varieties of glutinous rice.** *Philipp. Agriculturalist* 1952, **35,** No. 8, 428-33.

Studies in the Philippines during 1946-7 are reported on the yield, height, number of bearing culms, flowering period, date of maturation, susceptibility to lodging, diseases, insect pests and milling percentage of the following 4 glutinous rice varieties : Linihim, Malagkit Sungsong, Dinamulag and Paleod. The average yields of Linihim, Malagkit Sungsong and Paleod were 32.2, 13.6 and 7 kg. clean grain per ha., respectively ; the yields of Dinamulag were extremely low owing to poor germination and insect-pest damage. The mean plant heights of Linihim, Malagkit Sungsong and Paleod were 138.9, 129.5 and 95.2 cm., the number of days from sowing to maturation were 139.6, 136 and 133.4 days and the number of bearing culms per hill averaged 12.9, 17.3 and 12.8, respectively. Linihim tended to lodge badly, Malagkit Sungsong slightly, whilst Paleod and Dinamulag did not lodge at all.—P.J.B.

1310 Srinivasamurthy, T. **Improved strains of paddy in Mysore.** *Mysore agric. J.* 1953, **29,** No. 1, 21-8.

A description of 21 varieties of rice and details of 5 promising strains under trial are given.—M.A.

1311 Matsuo, T. **Genecological studies on cultivated rice.** [Japanese] *Bull. nat. Inst. agric. sci. Ser. D.* 1952, No. 3, 1-111, bibl. 80, illus., English summary pp. 94-107.

An attempt was made to classify over one thousand varieties of rice according to morphological and ecological characteristics. The varieties were grouped into 3 main plant types on the basis of external morphological characteristics, such as grain size. The centres of distribution of the three plant types are Japan, Java and India, respectively. It was found, as a result of experiments carried out in Japan, that the varieties could be classified into 3 groups (roughly corresponding with the 3 main plant types) according to their reactions to environmental factors (length of photoperiod, temperature and soil fertility) and according to the degree of their resistance to lodging, rice borer and blast (*Piricularia oryzae*).—W.J.B.

1312 Widiez, F. Du nouveau dans la culture du riz en Provence. [**New developments in rice-growing in Provence.**] *Potasse* 1953, No. 206, 111-12, illus.

Two Japanese varieties of rice, Norin 20 and Ishikari Tiroku, were harvested 104 and 113 days after sowing and yielded 8000 and 7200 kg./ha., respectively, as compared with the local variety Ballila which was harvested 132 days after sowing, giving a yield of over 10,000kg./ha. The variety Ishikari was the most resistant to lodging and, unlike Norin 20, was not so severely attacked by sparrows.—M.A.

1313 Sahadevan, P. C. **Studies on the problem of loss of viability of rice seeds in storage.** *Madras agric. J.* 1953, **40,** No. 4, 133-43, bibl. 8. [Pattambi]

The results of the following experiments on rice storage over a 6-yr. period are given: differential maturity of the seeds, degree of seed maturity and methods of storage, place effect and methods of storage and aerobic and anaerobic methods of storage using different containers. Seed of 20 and 25 days' maturity gave lower germination percentages than that of 30, 35 and 60 days' maturity. In seeds stored in tins, in cement bins, in wooden boxes and mud bins coated with tar and in straw-twist bundles thickly coated with a mixture of cow dung and red earth, germination improved. The character causing loss in germination was found to be correlated with the capacity of seeds to germinate after harvest without a rest period. The inheritance of this character was found to be of the multifactorial type with continuous variations in the F2 generation. It was found to be strongly associated with red pericarp and, to some extent, with colour of lemma and palea.—M.A.

1314 Barat, M. H. Les maladies du riz et leur traitement aux U.S.A. [**The diseases of rice and their control in the USA.**] *Bull. Madagascar* 1953, No. 72-3, 19-35, bibl. 55. [Lab. Path. veg., Tananarive]

1315 Datta, P. K. and Datta, C. **High dosages of X' irradiation on inhibition of growth in rice seedlings.** *Sci. and Cult.* 1953, **18,** No. 10, 500-3, bibl. 8, illus. [Sec. Pl. Physiol., Bose Inst., Calcutta]

Seeds of soaked and sprouted rice (*Oryza sativa* var. Boro Assam II) were irradiated with 5 dosages of X-rays, and then, together with the control, planted in shallow earthenware pots. Tables give the percentage of plants which emerged from the soil at 4 successive weekly intervals and the inhibitory effects of irradiation on different parts of the rice seedlings. Results show that, under irradiation, the rate of increase in length of the root and the production of new roots diminish, and that, when dosages were high, the percentage of inhibition in growth is not directly related to the dosages applied. The cytological effects of, and organic chemical changes in, the irradiated plant are discussed.—M.A.

1316 Misra, G. **Photoperiodic behaviour of medium-early varieties of rice.** *Proc. 40th Indian Sci. Congr., Lucknow 1953* Pt. 3, 115. [Calcutta]

The effects of a short-day photoperiod of 10 hr. on the flowering behaviour of three varieties of medium-early rice, T.3, T.12 and T.21, were studied. The emergence of ears was delayed by short-day treatment in the early stages of growth and the delay was increased by the prolongation of the treatment. The photoperiodic response of medium-early varieties is thus akin to that of early varieties.—W.J.B.

1317 Kimura, J. and Okajima, H. **Studies on the mechanisms of phosphorus and iron absorption by rice plant. 1.** *Rep. Inst. agric. Res. Tohoku Univ.* 1950, **1-2,** 1-13, bibl. 8, illus. [Received 1953]

Seedlings of rice and barley were grown in culture solutions containing varying amounts of soluble P and Fe in an attempt to determine the presence of iron phosphate in the seedlings ; the detection of inorganic phosphate was made by microchemical tests. Rice seedlings grown in culture solutions containing large quantities of P showed chlorosis but this symptom was corrected by the addition of iron. Barley seedlings tolerated higher concentrations of P but high concentrations of Fe acted injuriously. In rice seedlings, the correction of chlorosis was attributed to the combination of P and Fe to form ferric phosphate with a decrease in the amount of P available to the plants. In rice plants, applications of P increased the amount of inorganic P in the stems and leaves and with added Fe it appeared concentrated in the stems. In barley plants grown in culture solutions containing added P and Fe, inorganic P increased in the roots but decreased in the stems and leaves as the P/Fe ratio decreased. Iron phosphate tended to form in the tops and roots of rice plants and chiefly in the roots of barley plants.—M.A.

1318 Okajima, H. and Kimura, J. **Studies on the mechanisms of phosphorus and iron absorption by rice plant. 2.** *Rep. Inst. agric. Res. Tohoku Univ.* 1951 **3,** 1-11, bibl. 7, illus. [Received 1953]

The effects of supplying varying amounts of P and Fe to rice and barley grown in culture solutions were studied by the determination of active Fe, by the distribution of ferrous and ferric iron in the stems and leaves and by examination of the activities of catalase and peroxidase. In rice, the ratios of active Fe to total Fe increased with the supply of Fe and their values were high when the supply of P was low. In barley, the content of total Fe was large, but the ratios of active Fe to total Fe were lower than in rice. In both plants, ferric iron increased as the iron supply increased, and, in rice, catalase and peroxidase increased, particularly in solutions with low P/Fe ratios.—M.A.

1319 Williams, K. T. and Bevenue, A. **A note on the sugars in rice.** *Cereal Chem.* 1953, **30,** No. 3, 267-9, bibl. 7. [W. Reg. Res. Lab., Albany, Calif.]

note is given on the reducing sugar and total gar content of the white, brown and parboiled ain of 3 rice varieties.—P.J.B.

EOSINTE

20 MELHUS, I. E. and others. **Observations on the nutritive value of teosinte.** *Science* 1953, **117,** No. 3028, 34-5, bibl. 12. [Iowa State Coll. Guatemala Trop. Res. Cent., Antigua]

mparative data are given of the fat, nitrogen, ethionine, lysine, tryptophane and niacin content the hulled grain of 4 teosinte (*Euchlaena xicana*) strains and of the whole grain of a uatemalan maize strain and of a high-yielding S commercial hybrid. The N content of the osinte strains ranged from 3.25 to 3.68%, com- red with 1.54 and 1.32% for the Guatemalan ain and the US hybrid, respectively. The ethionine contents ranged from 0.4 to 0.58% for e teosinte, compared with 0.14 to 0.16 for the 2 ize varieties. Methionine is recognized as the niting amino acid in many vegetable protein diets. he tryptophane and lysine contents of the teosinte ains were not significantly different from those the maize. The niacin and fat contents of the osinte strains were lower than that of the maize. ve F_1 maize × teosinte crosses did not differ in mposition from the maize, but in the F_2 genera- n of the crosses, considerable variation was ted. The dietetic significance of these results is efly discussed.—P.J.B.

ENERAL

21 DOBBEN, W. H. van and LUGT, C. Het opbrengstverhogend effect van schoffelen in granen. [**The part played by hoeing in increasing the yield of cereals.**] *Landbouwk. Tijdschr., Wageningen* 1953, **65,** No. 7, 397-401, English summary p. 401. [Cent. Inst. Agric. Res., Wageningen]

e effects on the yields of cereals of two methods destroying weeds, hoeing and spraying with % DNOC, were compared in trials in which two methods were applied separately and in nbination. On heavy soils, hoeing, compared h no treatment, increased the yields of grain m oats and wheat, whereas applications of OC had little effect on yield. On light sandy s, where barley and rye were grown, increases in ilds of grain over control (no treatment) were ained by hoeing, by applications of DNOC, and a combination of both treatments, but there e no significant differences between the in- ses so obtained. It is considered doubtful ether, on sandy soils, any benefit to cereal crops can be obtained by hoeing, other than the benefit ascribable to the elimination of weeds.—W.J.B.

1322 PAATELA, J. Tärkeimmät viljalajikkeemme ja niiden viljelyalueet. **The most important varieties of cereals grown in Finland and their growing areas.** *Suom. Maataloust. Seur. Julk.* 1953, **80,** No. 1, 3-78, bibl. 48, illus., English summary pp. 75-8. [Univ. Helsinki]

Investigations were conducted to find out to what extent the most important varieties are grown on farms of different sizes in different parts of Finland. The material was collected in 1950 and 1951. The results for the first year applied to Agricultural Associations, in 1951 to Administrative Districts, and these were joined together as Principal Areas (Southern, Central, and Northern Finland, and Lapland). The cultivation of many new or popular varieties (Kärn II, Diamant II wheats, Toivo, Pekka and Sangaste rye, Balder barley, and Sisu oats) seemed to be common on farms largêr than medium-sized and the cultivation of un-improved strains was most frequent on small farms.—From author's summary.

1323 PAMMER, F. Ergebnisse der Getreidesortenversuche 1951. [**Results of 1951 cereal trials (in Austria).**] *Ber. Arbeitstag. Bundesanst. alp. Landw., Admont 1952* 143-5. [Bundesanst. Vienna and Admont]

Two varieties of winter barley, Brucker No. 2 and No. 3, have proved very promising ; of the older varieties, Tschermaks yielded well under all conditions. The Pannonian varieties of rye, Tyrnauer and Marchfelder, gave the highest yields not only in the lowlands but also in the alpine regions. Bayerngerste, an Austrian summer barley, showed relatively high resistance to mildew, while among the best stiff-strawed varieties Herta, Rika, Haisa and Haka were noteworthy. Very good yields of summer wheat in the lowlands were given by the cross Znaimer × Tucson. Austrian White was the best oat variety in trials.—M.A.

1324 PFEIFFER, R. and NEKY, E. Ergebnisse der Getreideversuche des Jahres 1951/52. [**Results of 1951/52 cereal trials (in Austria).**] *VersErgebn. Bundesanst. alp. Landw., Admont* 1953, **20,** pp. 47.

Yield figures from variety trials of winter rye, summer barley, summer wheat, oats and barley/oat mixtures are given. Results of cereal trials in the Ennstal and of scattered single trials are tabulated. A very cold and wet May resulted in yields from that group of winter oats which were acclimatized to alpine weather conditions being higher than that of the group of new varieties. Of the first group, Oberkärnter gave the highest grain yield and Kefermarkter the highest straw yield. Of summer barleys, Weibullsholm Rika, 4 Bavarian varieties, two Weibullsholm strains and Herta gave the highest yields. The Swedish strains showed more resistance to laying while the Bavarian strains showed the greatest resistance to mildew. Weibulls No. 4808 and Weibulls Karn II gave the highest yields of summer wheat varieties with medium resistance to black rust, while the new strains L2, L1 and L3 were completely resistant to black rust and gave only slightly lower yields than the first group. The highest yielding oat varieties were Firlbecks Geld and Stammprüfung R. As in previous years, a mixture of oats and summer barley gave higher yields than a pure oat stand, while a pure stand of barley gave higher yields than a barley/oat mixture.—M.A.

1325 de HAAN, H. **Maintaining varieties of self-fertilized crop plants.** *Euphytica* 1953, **2,** No 1, 37-45, bibl. 12. [Pl. Breed. Inst., Wageningen]

A brief review is given of procedure used in the Netherlands for maintaining the purity of cereal varieties, together with notes on the deterioration of varieties and the maintenance of local varieties and parental stocks.—P.J.B.

1326 ISELY, D. **Employment of tetrazolium chloride for determining viability of small grain seeds.** *Proc. Ass. Off. Seed Anal. N. Amer. 1952* 143-53, bibl. 26. [Iowa Agric. Exp. Sta., Ames]

Data are presented to show that under most conditions, the use of 2,3,5-triphenyl tetrazolium chloride will give a reasonably accurate indication of seed viability. The test is very accurate in the case of seed with high viability, but less so in the case of seed with low viability. The merits and limitations of the method are discussed, together with observations on the nature of death in cereal seeds and the process of necrosis. The method of using tetrazolium chloride suggested includes pre-soaking the seed for 3-4 hr., followed by hulling the seed, where a hull is present, and then placing the seed in a 0.05% aqueous solution of tetrazolium chloride. Viability assessments can then be made within 3-4 hr.—P.J.B.

1327 DOYLE, E. J. and others. **The effect of potassium nitrate on the germination of freshly harvested wheat, oats, barley and flax seed.** *Proc. Ass. Off., Seed Anal. N. Amer. 1952* 93-101, bibl. 4. [Pl. Prod. Div., Prod. Serv., Canad. Dep. Agric., Ottawa]

Germination tests were made on seed of common spring wheat, durum wheat, oats, barley and flax, to compare 0.2% KNO_3 solutions with tap water as germinating media. The use of KNO_3 solutions resulted in significantly higher germination percentages than tap water for all types of seed and also increased the rate of germination and seedling vigour. In the case of 46 samples of wheat, pre-chilled samples of dormant seed had an average germination percentage of 52.7%; the substitution of KNO_3 solutions for tap water in these trials increased germination by 27%. Further trials with this seed in spring, when dormancy had disappeared resulted in an increase of 9% in germination in the case of KNO_3 solutions, indicating that at least 9% of the dormant seed did not respond to KNO_3 in autumn. In the case of oats and barley, autumn tests with KNO_3 solutions gave results showing that the full viability of the seed was expressed. Flax seed gave results similar to those of the wheat seed, in that 6% of the seed was dormant and did not respond to the KNO_3 solutions in autumn.—P.J.B.

1328 PASSLOW, T. **Armyworm control in cereal crops [in Queensland].** *Qd agric. J.* 1952, **75,** No. 4, 242-4, illus.

1329 KRESS, H. Erfolgreiche Jarowisation bei Sommergetreide und Süsslupinen. [**Successful vernalization of summer cereals and sweet lupins.**] *Dtsch. Landw., Berlin* 1953, **2,** 1-12, illus. [Forschst. Agrobiol. Pflzucht. Gülzow-Güstrow (Mecklenburg)]

Details are supplied of the results from experiments on vernalized summer wheat, summer rye, summer barley, summer oats, summer rape, yellow and sweet lupins. Figures for rate of growth, ear appearance, straw weight, grain yield and thousand-grain weight are given for the cereals. It is concluded that by vernalization the loss in yield caused by late sowing can be avoided. Vernalization resulted in the quicker ripening of yellow sweet lupins.—M.A.

1330 RIEPMA, P. De betekenis van D.N.C. voor de Nederlandse graanbouw. [**The importance of DNOC for grain-crops in the Netherlands.**] *Landbouwk. Tijdschr., Wageningen* 1953, **65,** No. 6, 334-8. illus., English summary p. 338.

Over the period 1946-52, sprays of DNOC, MCPA and 2,4-D were applied to weed-free crops of winter rye and winter wheat at the rates of 5, 1 and 1 kg., respectively, of active material in 1000 l. of water per ha., on experimental plots. DNOC significantly increased the yield of winter rye and winter wheat when applied between the 2.5 - 7.5 leaf stages. The yield-stimulating effect of DNOC was greatest at the early stages of tillering (corresponding to the 3.5 - 4.5 and 3.5 - 5 leaf stages for winter rye and winter wheat) and least marked at the 5 - 7 leaf stage. When applied at the optimum stage of development, DNOC gave increases in yield from both crops of roughly 300 kg. per ha. [2.3 cwt. per ac.] over the control. MCPA and 2,4-D had no significant stimulating effect on yields. When

plied at the tillering stage, 2,4-D caused a slight
duction in the yield of wheat. The increase in
eld caused by the application of DNOC to weed-
e crops in these experiments is calculated to
ve given an adequate financial return over the
st of application.—W.J.B.

31 MITCHELL, J. and others. **Crop and variety response to applied phosphate and uptake of phosphorus from soil and fertilizer.** *Agron. J.* 1953, **45,** No. 1, 6-11, bibl. 7. [Univ. Saskatchewan, Saskatoon]

studies on varietal differences in P uptake, 4
rieties of hard red spring wheat, 3 of barley and
of oats were grown in Saskatchewan on 2 soil
pes receiving 50 lb. per ac. of 11-48-0 (NPK) with
^{2} as a tracer. The results showed that differences
tween varieties in the yield of oats and barley
re evident, but that yield differences between
rieties in response to the P treatment were
dent only in the case of barley ; these differ-
es were not accompanied by significant differ-
es between barley varieties in respect of their
take of soil and manurial P. One soil-type used
s slightly to moderately responsive to P treat-
nt ; on this soil, P treatment resulted in yield
reases, with 25% utilization of applied P and a
rked decrease in utilization of soil P, compared
h untreated controls. On the other soil-type,
ich was very responsive to P treatment, the
ps took up an average of 33% of the applied P,
did not differ significantly from untreated
trols in respect of uptake of soil P. Barley
wed a significantly greater uptake of applied
han wheat at one location, but there was no
nificant difference between wheat and oats, or
s and barley.—P.J.B.

2 WORT, D. J. **Physiological aspects of micronutrient sprays and dusts.** *Proc. Joint 9th N. Cent. and 6th W. Canad. Weed Contr. Conf. 1952* 6-8. [Univ. Brit. Columb., Vancouver]

trials in British Columbia, Marquis wheat,
bi barley and Victory oats were treated with
ar sprays of micronutrient solutions when the
eals were 5 in. high and when the flower pri-
rdia were present. The micronutrients used were:
Mo, Cu, Zn, Fe, Mn and Mg, alone, combinations
Mo + B, Mo + Cu, Mo + Cu + B, Cu + B and
+ Cu and of 2,4-D amine + Cu, 2,4-D + Fe,
-D + Mg and 2,4-D alone. No treatments re-
ed in appreciable differences, compared with
reated controls, in time of heading, flowering,
ripening of any crop. Yield increases in barley,
eat and oats followed the use of Mo alone, or in
nbination ; this element was the only one which
ulted in consistent increases in the yield of all
ereals and increased the straw yields of wheat. Mg alone, or in combination, increased the grain yields of barley.—P.J.B.

1333† SMITH, A. M. and MABBITT, L. A. **The contribution to soil organic matter and nitrogen from cereal residues and undersown crops.** *J. Soil Sci.* 1953, **4,** No. 1, 98-106, bibl. 7. [Edinb. and E. Scot. Coll. Agric.]

Investigations were carried out to determine the manurial value of cereal stubble ploughed in with an undersown crop of grass or clover. In the period 1947-50 numerous experiments were carried out in all of which the quantities of organic matter and N contributed to the soil by the after-harvest residues of cereals alone, cereals and ryegrass, cereals and ryegrass manured with N, and cereals and red clover, were compared. The cereals used were oats, barley and rye. The residues of cereals undersown with red clover contributed significantly more organic matter and more N to the soil than any other treatment and had the most beneficial effect on succeeding crops of cereals. Undersowing cereals with ryegrass did not benefit succeeding crops, except when the ryegrass was fertilized with N.—W.J.B.

1334 HARRINGTON, J. B. **Cereal breeding procedures.** *FAO Devel. Pap. No. 28 1952,* pp. 122.

This publication is intended to provide practical information on the organization of breeding programmes for wheat, rice and other cereals. The following aspects are dealt with : introduction and selection, hybridization, recording, determination of plot size and different types of yield trials, variety testing, numbering and labelling, the planning of tests, nursery testing, replicated plot testing, laboratory and greenhouse testing, purification and increase of varieties, and the analysis and reporting of results.—P.J.B.

LEGUMES

COWPEA

1335 MIDDLEKAUFF, W. W. and STEVENSON, E. E. **Insect injury to blackeye bean seeds in central California.** *J. econ. Ent.* 1952, **45,** No. 6, 940-6, bibl. 9, illus. [Div. Ent. and Parasit., California Univ., Berkeley]

An account is given of trials in controlling *Lygus hesperus*, *L. elisus*, *Heliothis armigera*, *Etiella zinckenella*, and *Prodenia praefica* on blackeye beans [*Vigna sinensis*] in the field with DDT, Toxaphene or DDT-sulphur dust.—E.B.O.

SOYABEAN

1336 SOYBEAN DIGEST. **Clark [soyabean] is adapted to middle area [of USA].** *Soybean Dig.* 1953, **13,** No. 8, 10-11.

Clark is a medium-tall variety, similar to Lincoln, but about 7 days later in maturing. It is resistant to leaf spot and is adapted to south-eastern Nebraska, north-eastern Kansas, north and central Missouri and southern Iowa, Indiana and Illinois and northern Kentucky. In the northern part of its area of adaptation it is suitable as a full-season variety, and, in the southern part, it is early enough to precede autumn-sown cereals. In 2-years' trials in the southern part of its area of adaptation, Clark gave average yields of 41.9 bu. per ac., compared with 35.0, 35.3 and 38.2 bu. per ac. for Chief, Wabash and Perry, respectively. In the northern part of its area of adaptation, Clark gave average yields of 40.8 bu. per ac. over a 4-year period, compared with 35.1, 36.3, 35.3 and 31.9 bu. per ac. for Adams, Lincoln, Illini and Chief, respectively.—P.J.B.

1337 SOYBEAN DIGEST. **Jackson soybean may lower growers costs in South-east [USA].** *Soybean Dig.* 1953, **13,** No. 9, 14-15, illus.

Jackson, to be released for multiplication in 1954, is adapted to central N. Carolina, the eastern two-thirds of S. Carolina, southern Georgia, Alabama and Mississippi, north Florida and north-eastern Louisiana. This area is that to which Roanoke is adapted. Jackson is considered to be best adapted to the relatively lighter soils of this region, though its resistance to lodging enables it to yield well on heavy, poorly drained soils. Over the whole area of its adaptation, it has averaged 31.9 bu. per ac. during a 3-year period, compared with 30.4 bu. for Roanoke and 29 bu. per ac. for Dortchsoy 31. It has averaged 2 days later in maturing than Roanoke and 6 days later than Dortchsoy. Jackson had an average plant height of 39.6 in., compared with 36.5 in. for Roanoke and 29.4 in. for Dortchsoy 31. Jackson has good resistance to lodging and is well-suited for combine-harvesting.—P.J.B.

1338 OWEN, C. W. **Harosoy new variety [of soyabean] for Ontario.** *Soybean Dig.* 1953, **13,** No. 8, 11. [Domn Exp. Sta., Harrow, Ontario]

A note is given on Harosoy, a new variety adapted to the greater part of the Province of Ontario. It is expected largely to replace Harman, compared with which it is earlier in maturing, more stiff-strawed, has a higher oil content and a pure yellow seed. In 6-years' trials at Harrow, Harosoy gave an average yield of 28 bu. per ac., compared with 24, 23 and 25 bu. per ac. for Earlyana, Hawkeye and Harman, respectively.—P.J.B.

1339 CALMA, V. C. and ROSARIO, C. V. **A study of the adaptability to Los Baños [Philippines] conditions of eleven varieties of soybean.** *Philipp. Agriculturalist* 1951, **35,** No. 7, 375-8. [Received 1953]

Trials were carried out with the following soyabean varieties introduced from the USA: Arksoy, Creole, Georgian, Hongkong, Mamredo, Monetta, Nanking, Palmetto, Pennsoy, Roanoake and Seminole. In dry-season sowings, Seminole gave the highest yields, followed by Monetta and Creole. Dry-season sowings resulted in dwarfed plants and, in the case of most varieties, seed yields were low. Following wet-season sowings, there were highly significant differences between the yields of seed and straw of the different varieties. Creole gave the highest seed yields, followed by Palmetto and Monetta. Seed yields of the different varieties ranged from 646 to 1739 kg. per ha. for the wet-season sowings.—P.J.B.

1340 ICHINOHE, M. **On the parasitism of the soybean nematode *Heterodera glycines.*** [Japanese] *Res. Bull. No. 64. Hokkaido nat. agric. Exp. Sta.* 1953, 113-24, bibl. 9, illus., English summary pp. 122-4.

The degree of susceptibility of soyabean (*Glycine soja*), azuki bean (*Phaseolus angularis*), kidney bean (*Ph. vulgaris*) and Spanish runner bean (*Ph. coccineus*) to infection by *Heterodera glycines* was assessed in experiments in which the numbers of adult female nematodes attached to the tap roots of plants grown for 6 weeks in infested soil were counted. The degree of infection (the average number of adult females per tap-root) was 28.3 for soyabean, 26.7 for azuki bean, 3.2 for kidney bean and 0 for Spanish runner bean. The degree of infestation of a given plant was found to be unrelated to the numbers of larvae which invaded the root but related to the ability of the plant to hinder the development of the larvae inside the root. In the case of Spanish runner bean, no larvae reached the adult female stage. In further tests, 28 plant species (including 11 legumes in addition to the four species already mentioned) were grown in pots of soil inoculated with cysts of *H. glycines.* The roots of all the legumes and of a few non-legumes were invaded by the larvae. None of the legumes was more susceptible to infestation than the four species mentioned. It is suggested that plants which permit invasion of their roots by larvae but inhibit their further development might be used as trap crops to reduce nematode population in infested areas.—W.J.B.

1341 EVANS, H. J. and NASON, A. **Pyridine nucleotide-nitrate reductase from extracts of higher plants.** *Pl. Physiol.* 1953, **28,** No. 2, 233-54, bibl. 33, illus. [McCollum-Pratt Inst., The John Hopkins Univ., Baltimore, Maryland]

The properties of an enzyme from soyabean leaves is described which catalyzes the reduction of nitrate to nitrite by the oxidation of TPNH or

PNH. Evidence is presented that this or a milar enzyme is present in six other higher plant ecies examined.—From authors' summary.

342 Bureau, M. F. and others. **The effect of phosphatic fertilizer material and soil phosphorus level on the yield and phosphorus uptake of soybeans.** *Agron. J.* 1953, **45,** No. 4, 150-4, bibl. 13. [Ohio Agric. Exp. Sta., Wooster]

tudies were made of the yields and P-uptake of yabeans grown in Ohio on 3 soils containing 53,).5 and 11.5 lb. per ac. of P_2O_5, respectively. Each manure was applied at a rate of 50 lb. P_2O_5 per c. As the amount of soil P increased, so did the y-matter yields of the plants. In no case did treatment raise seed yields to the level of those here no P was applied ; nor were there any gnificant differences between the seed yields of ants growing on the 3 different soils. Compared ith where no P was applied, the dry-matter yields plants were higher following treatment with lcium metaphosphate and double superphos-hate, but lower following treatment with super-osphate, dicalcium phosphate and fused tri-lcium phosphate. It was evident that P was t a limiting factor in seed production, though a rge proportion of the P in the plants came from e manures applied.—P.J.B.

ROUNDNUT

43 Massin, P. L. L'arachide et l'huile d'arachide aux États-Unis. [**Groundnuts and groundnut oil in the USA.**] *Oléagineux* 1953, **8,** No. 7, 481-8.

44 Go Ban Hong and Schulenborgh, J. van. Bodenkunde en bemesting van de katjang tanah (*Arachis hypogaea* L.). [**Suitable soils and manuring for the groundnut (*Arachis hypogaea*).**] *Landbouwk. Tijdschr., Wageningen* 1953, **65,** No. 6, 339-52, bibl. 60, illus., English summary p. 351.

he literature on the climate, soil-type, manures ad cultural practices required to ensure a high-yielding crop of groundnuts is reviewed.—W.J.B.

45 Westmorland, W. G. and Klingman, G. C. **Pre-emergence weed control in peanuts.** *Down to Earth* 1953, **8,** No. 4, 12. [Agron. Dep., N. Carolina State Coll.]

ials during 1951 and 1952 are reported on the use o DNOSBP alkanolamine salt, 2,4-D low-volatility esters and DNOSBP/2,4-D mixtures for weed control in groundnuts. The materials were applied in a spray volume of 16 gal. per ac. when the seedlings were just starting to break through the soil surface. Rates of treatment used were 3, 6 and 9 lb. DNOSBP per ac., 1, 1.5 and 2 lb. 2,4-D low-volatility esters per ac. and mixtures of DNOSBP and 2,4-D in ratios of 1.5/1, 3/1 and 5/1 lb. per ac. of DNOSBP and 2,4-D, respectively. In neither year were there significant differences between the materials or rates of treatment, in terms of weed control or yield. In almost all cases, the highest rates of treatment gave the best weed control. DNOSBP caused no damage to stands or yields, and entailed very few risks to neighbouring crops. 2,4-D stunted groundnut seedlings for 2 - 3 weeks after emergence, though at 6 weeks after treatment, there were no noticeable differences between plants treated with 2,4-D and the untreated controls. DNOSBP/2,4-D combinations possessed no advantages over each material used separately. —P.J.B.

1346 Harrison, A. L. and others. **Results of some peanut seed treatment tests in Texas.** *Phytopathology* 1953, **43,** No. 5, 291. [Abstract]

Studies on the use of different fungicides for treating Spanish-type groundnut seed, showed that the following materials were effective in the order given, starting with the most effective : C.C.C. 228, Aagrano 350, Orthocide 406, C.C.C. 5400, Mathieson 275, 2% Ceresan, Arasan and Spergon. —P.J.B.

1347 Bouffil, F. and Jaubert, P. Une affection nouvelle des fruits de l'arachide : la maladie des " Gousses vides." [**A new malady of groundnut fruits, called "empty pods".**] *Oléagineux* 1953, **8,** No. 5, 273-81, bibl. 5, illus. [Cent. Rech. Agron., Bambey, Senegal]

Information is given on the bacterial disease causing empty pods in groundnut crops in Senegal. As it appears only in plants affected by rosette, the control methods (briefly given) are the same as for rosette.—E.B.O.

PEA

1348 Lammers, R. P. De teelt van conservendoperwten op akkerbouwbedrijven. [**The cultivation on arable farms of green peas for packing.**] *LandbVoorl.* 1953, **10,** No. 5, 181-96, illus.

About 2600 ha. of green peas for preserving by canning or quick-freezing are grown on arable farms (usually in the region of the factories) in the Netherlands. The advantages of growing green, as opposed to dried, peas—the early harvest-date, the opportunities for catch-cropping and the superior quality of the straw for fodder—are pointed out. Weed control methods used in the Netherlands are described. The harrowing of weedy crops is becoming more common. Nitro-chalk is used as a means of delaying the maturity of portions of the crop, thus spreading the harvest. The provision of N for the pea-crop, in the form of nitro-chalk, is considered especially necessary on acid sandy land where root-nodule development is poor. On the average, about 15 tons of pea-haulm silage are produced per acre. Methods of mechanical harvesting are described.—W.J.B.

1349 BLAIR, I. D. and COPP, L. G. **Pea seed disinfection : A statistical study.** *N. Z. J. Sci. Technol. Sect. A.* 1953, **34,** No. 5, 397-404, bibl. 11.

Treated peas, variety William Massey, were sown in the field on successive occasions from spring to autumn during several crop seasons. Statistical analyses of transformed data revealed significant differences between sowing dates in the emergence counts obtained. After some mid-summer sowings, untreated seed germinated as well as any disinfected line, whereas after some autumn sowings all treatments were significantly better than untreated. Over all sowing dates, tetramethyl thiuram disulphide (Premasan) and tetra-chlor-p-benzo-quinone (Spergon) were highly effective in improving field emergence. The locally supplied organic mercury dusts and the used-oil treatment produced little benefit, although in an experimental set, dusts with twice the normal mercury content were effective. In a glasshouse pot trial, soil moisture was found to have a greater influence on emergence than temperature.—Authors' summary.

1350 BLUMER, S. and HARDER, A. Über die Beizung von Gemüsesamen. [**Disinfection of vegetable seeds.**] *Landw. Jahrb. Schweiz* 1953, **3,** 315-35, bibl. 20, illus. [Eidg. Versanst. Obst-, Wein- u. Gartenbau, Wädenswil]

The effect of 8 disinfectant dusts on seeds of peas and beans was tested both in the field and in the greenhouse. The dusts had no effect where a disease had already penetrated the germ but preparations consisting of tetrachloroquinone (Spergon), dichloronaphthoquinone (Phygon) or tetramethylthiuramdisulphide (Fernasan), controlled *Rhizoctonia solani* satisfactorily. In the field, pretreatment of the seed with disinfectants resulted in a better crop where late sowing, bad weather conditions or poor seed quality were evident. Disinfection did not damage the storing qualities of the seed and its main effect lay in the destruction of harmful fungal and animal organisms in the soil and any superficial seed moulds which had developed during storage.—M.A.

1351 DAVIS, A. C. and SWENSON, K. G. **Evaluation of insecticides for pea insect control.** *J. econ. Ent.* 1953, **46,** No. 2, 321-3, bibl. [New York State Agric. Exp. Sta., Geneva]

An account is given of 2 years' trials in controlling the pea aphid, *Macrosiphum pisi*, and the pea weevil, *Bruchus pisorum*, on peas.—E.B.O.

1352† GUSTAFSON, F. G. **Influence of photoperiod on thiamine, riboflavin and niacin content of green plants.** *Amer. J. Bot.* 1953, **40,** No. 4, 256-9, bibl. 13. [Univ. Michigan]

[See also *Herb. Abstr.* 17 : 414.] Alaska peas and Black Valentine peas were subjected to varying temperatures and to varying light exposures. It was found that, in general, at temperatures of 14°, 20° and 26°C. there was a decrease in thiamine content as the plants were exposed to longer photoperiods. On the contrary, riboflavin and niacin concentrations increased with increase in length of photoperiod.—M.A.

1353 REATH, A. N. and WITTWER, S. H. **The effects of temperature and photoperiod on the development of pea varieties.** *Proc. Amer. Soc. hort. Sci.* 1952, **60,** 301-10, bibl. 15, illus. [Michigan Agric. Exp. Sta., East Lansing]

A number of commercial pea varieties was grown in greenhouses at 9, 12 and 16 hr. day lengths, each day length being combined with night temperatures of 50° or 60°F. Successive field sowings were also made. The effects of temperature and photoperiod suggested that they are conditioned by one another, and vice versa. At night temperatures of 60°F., the 2 early varieties Alaska and Surprise were day-neutral in respect of pod production and flowering, while at 50°F., flowering and pod production were increased by lengthening the day length. The majority of the other varieties behaved as long-day plants when grown at night temperatures of both 50° and 60°F. All the mid-season and late varieties tested required fewer degree-days for flowering as day length was increased. It was noted that the degree-day requirement for flowering in all varieties was greater at 50° than at 60°F. In field-sown plants, the heat-sum value was a more variable expression for predicting time of maturity than was the multiple of degree-days summation and average day length.—P.J.B.

BEAN

1354 MCGREGOR, W. G. and others. **Artificial defoliation of field beans.** *Canad. J. agric. Sci.* 1953, **33,** No. 2, 125-31, bibl. 2. [Cent. Exp. Fm, Ottawa, Ont.]

Trials were carried out using 2 dust and 4 spray formulations for defoliating bean crops prior to harvest. The most effective treatments were sprays containing 30 lb. per ac. of monosodium cyanamide (X5 ; 65% active ingredient) and 12.5 lb. per ac.

ammonium thiocyanate, the use of which vanced the harvest date by 7-10 days. Com- ete coverage of the foliage was necessary to sure full defoliation. Ammonium thiocyanate peared to have a slightly less adverse effect on ed yields than did monosodium cyanamide. either treatment appeared adversely to affect e amount of shattering during harvest, or reshing efficiency. Sprays applied when the pods re well formed, but the leaves green, resulted in ich greater decreases in seed yield and 1000-grain ight than those applied when the pods were ll somewhat green, but when the lower leaves on plants were beyond the yellowing stage.— .B.

55 Cavanillas Rodriguez, L. and Angulo Carpio, María Dolores. Estudios sobre transpiración vegetal. Judías cultivadas en lisímetros. [**Studies of plant transpiration. Beans grown in lysimeters.**] *Anal. Edafol. Fisiol. veg.* 1951, **10,** No. 6, 603-24, bibl. 9, English summary p. 624. [Inst. Edafol. Fisiol. Veg., Madrid]

rieties of *Phaseolus vulgaris* from Leon and La ncha, respectively, were grown in two different l types in lysimeters. Records of evaporation and nspiration for the 3 years 1948-50 show their urse to have been remarkably uniform, and, m the figures obtained, irrigation requirements n be deduced. Studies of the leaf stomata showed t the number and size of the stomata vary in ordance with the amount of water available or plied to the plant. The stomata on the upper es of the leaves were in every case slightly larger n those on the under sides.—G.M.R.

56 Burkart, A. and Brücher, H. *Phaseolus aborigineus* Burkart, die mutmassliche andine Stammform der Kulturbohne. [***Phaseolus aborigineus*** **Burkart, the conjectured Andean prototype of the cultivated bean.**] *Züchter* 1953, **23,** No. 3, 65-72, bibl. 30, illus.

HER

7 Calzecchi-Onesti, A. ***Cicer arietinum* L.** *Ital. agric.* 1953, **90,** No. 1, 35-9, illus.

ormation is given on the morphology and tivation of chickpea, grown for human con- nption in Italy, mainly in the south.—E.B.O.

8† Silva Wahnon, J. Tremoços. Valor da rama na sideração e da semente na alimentação. [**The value of the stem and leaf of lupins as green manure and of the seed as fodder.**] *Melhoramento* 1952, **5,** 53-75, bibl. 5, English summary p. 74.

Sixteen different manurial treatments were applied to crops of yellow lupin (*Lupinus luteus*) grown for green manure. The largest yield of fresh, green material (39,775 kg. per ha. containing 7429 kg. of dry matter per ha.) was obtained from the application of 50 kg. sodium nitrate, 50 kg. ammonium sulphate, 400 kg. superphosphate and 50 kg. potassium sulphate per ha. Samples of the yellow lupin plants grown for green manure were cut and analysed. From the analysis it was deduced that, when the lupin crop was ploughed in, amounts of total organic matter varying from 1768 to 6534 kg. per ha. (according to manurial treatment) and amounts of N varying from 46 to 204 kg. per ha., would be added to the soil. Analyses of the seed of *Lupinus luteus* (sweet and bitter types), *Lupinus albus* and *Lupinus angustifolius* are tabulated. Sweet lupin seeds were richest in crude protein, ash and phosphoric acid. *L. albus* seeds were richest in oil.—W.J.B.

1359 Sluijsmans, C. M. J. Magnesiumbehoefte van blauwe lupinen. [**The magnesium-. requirement of blue lupins.**] *LandbVoorl.* 1953, **10,** No. 6, 243-4, illus. [Agric. Res. Sta., T.N.O. Groningen]

Blue lupins [*Lupinus angustifolius*] were sown on experimental plots on sandy soil, previously cropped in the same year with peas which had received manurial treatments equivalent to 0, 60 and 180 kg. per ha. of K_2O and 0, 20 and 60 kg. per ha. of MgO. Graphs are shown illustrating the quantities of dry matter yielded by the lupins at different rates of application of K_2O and MgO, and the influence of the content of MgO in the soil on the yields of dry matter. The highest yields of dry matter were obtained at the highest rates of application of K_2O. At any given rate of application of K_2O the highest yields were obtained on plots where 60 kg. per ha. of MgO had been applied. A content of less than 20 ppm. of MgO in the soil (measured in July when the lupins were sown) had a depresssing effect on yields of dry matter at all levels of application of K_2O.—W.J.B.

1360 Acharya, C. N. **Grow berseem and enrich the soil.** *Indian Fmg* 1953, **3,** No. 1, 16-18, illus. [Indian Agric. Res. Inst., New Delhi]

A general description is given of the cultivation of berseem (*Trifolium alexandrium*).—M.A.

GENERAL

1361 Allen, Ethel K. and others. **Pseudonodulation of leguminous plants induced by 2-bromo-3,5-dichlorobenzoic acid.** *Amer. J Bot.* 1953, **40,** No. 6, 429-35, bibl. 15, illus. [Dep. Bacteriol., Univ. Wisconsin]

Application of the sodium salt of 2-bromo-3,5-dichlorobenzoic acid to soyabeans, cowpeas and groundnuts, grown in culture solutions, resulted in the swelling of root tips, pseudonodular proliferations along the primary and lateral roots and reduction of the fibrous root systems. The histological and physiological symptoms are described.—M.A.

ROOTS

SUGAR-BEET

1362 ALDROVANDI, A. La meccanizzazione nella coltivazione della barbabietola [da zucchero. [**Mechanization in sugar-beet cultivation (in Italy).**] *Industr. saccar. ital.* 1952, **45,** No. 11-12, 423-31.

1363 ROBERTSON, L. S. and others. **Ten years' results from the Ferden rotation and crop sequence experiment.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 172-9, bibl. 2. [Michigan Agric. Exp. Sta., East Lansing]

The yields are given of sugar-beet, grown in Michigan over a 10-year period in 7 different 5-course rotations, each of which included two levels of manurial treatment throughout the entire course of the rotation. The highest yields of sugar-beet occurred where the crop followed beans, which, in turn, followed 2 years of a lucerne/brome grass [*Bromus inermis*] mixture grown for hay. The lowest sugar-beet yields occurred where there were beans, but no pasture legume, in the rotation. Sugar-beet following lucerne in years of high, but not low, rainfall produced relatively low yields. Over the entire 10-year period, average yields of sugar-beet following lucerne were similar to those where it followed maize. Over the 10-year period, in terms of sugar-beet yields, one year of lucerne/brome grass mixture was as good as 2 years of this crop, while red clover/timothy (*Phleum pratense*) mixture was almost as effective as lucerne/brome grass in this respect. Maize and bean yields were highest following the lucerne/brome grass mixture. Leaving a hay crop down for 2 years did not raise maize grain yields above those where the hay crop was down for 1 year, only.—P.J.B.

1364 HILL, K. W. **Effect of nitrogen supply on the sucrose percentage of sugar beets.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 210-16, bibl. 5. [Domn Agric. Exp. Sta., Lethbridge, Alberta]

Studies were made on the chemical composition of sugar-beet grown in a 9-year rotation of 2 years' sugar-beet, 2 years' wheat, 4 years' lucerne and 1 under wheat, and a 4-year rotation of 2 years' sugar-beet, 1 under wheat and 1 under barley, both rotations being laid down in 1929. These data were compared with those obtained from sugar-beet plots manured with 300 lb. ammonium nitrate per ac. in 1950. The root yield of sugar-beet on plots under the legume and non-legume rotations receiving N + P manure were almost equal; on control plots not manured, the root yield of sugar-beet in the non-legume rotation was 3 tons per ac. compared with 7 tons per ac. for that in the legume rotation. The sucrose content of the roots grown on plots under 3 manurial treatments (N, P and N + P) was similar in both rotations. The mean sucrose content of the roots from plots under all 3 manurial treatments was 16.2% over a 10-year period in the legume rotation, compared with 17.4% in the non-legume rotation. The content of nitrates in the soil under the legume rotation was higher than that under the non-legume rotation, particularly towards the end of the growing season. Applications of 300 lb. ammonium nitrate per ac. made on 2 August reduced the sucrose content of the roots from 16.42% for untreated controls, to 15.64%, with little increase in root yields. Similar N treatments made on 28 June did not affect the sucrose content, but increased root yields.—P.J.B.

1365 WADLEIGH, C. H. and others. **Effect of saline and alkali soil on growth of sugar beets.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 50-3, bibl. 3. [U.S. Salinity Lab., Riverside, Calif.]

Sugar-beet was grown in California on plots subjected to the following treatments: (a) leached during the previous season with sodium bicarbonate solution to give an exchangeable Na percentage of 50 in the top 2 ft. of soil, (b) irrigated with water containing 3000 to 12,000 ppm. NaCl, the concentration increasing to 12,000 ppm. as the plants matured, (c) regime (a) + (b). Untreated controls had a sucrose content of 13.4%, while plants on plots under regimes (a), (b) and (c) had sucrose contents of 13.9, 14.3 and 12.6%. Yields in lb. per 10 ft. of row were 69, 51.7, 38.9 and 33.5 for the controls and treatments (a), (b) and (c), respectively, while cationic Na contents in the leaves and petioles were 160, 270, 336 and 369 me. per 100 g. dry weight. Plants on plots high in exchangeable Na wilted badly in hot weather through insufficient penetration of irrigation water. It was considered that where sugar-beet leaves accumulate more than 200 me. Na per 100 g. of dry tissue, the plants may suffer from excess soil salinity and exhangeable Na in the soil. In these trials, selections of U.S. 22 sugar-beet plants with outstanding tolerance to salinity gave higher yields than normal U.S. 22 plants on saline, but not on alkaline plots, showing that it was possible to select sugar-beet for salt tolerance.—P.J.B.

1366 WAUTHY, R. and ROUSSEL, N. Les résultats des essais de variétés de betterave sucrière en Belgique de 1947 a 1952. [**Results of sugar-beet variety trials in Belgium from 1947 to 1952.**] *Publ. Inst. belge Amélior. Better.* 1952, No. 4, 176-91.

p till 1950, varietal trials carried out by the stitut de la Betterave were laid down on the ystematic method' which was replaced in 1952 balanced and simple lattice designs where the quirements of randomization and replication were lfilled. Examples of yield figures showing yields kg./ha. and the significant differences from the ean for the years 1947-52 are re-tabulated on a atistical basis.—M.A.

67 JAEHNL, G. Ergebnisse der Rübenversuche des Jahres 1952. [**Results of (Austrian) beet trials in 1952.**] *VersErgebn. Bundesanst. alp. Landw. Admont* 1953, **21,** pp. 53, illus.

venteen varietal and manurial trials and one acing trial on sugar-beet, fodder-beet and swedes ere laid down in Austria in different localities in 52. Sugar-beet trials were confined to the lleys. Tables give figures for root-weights, leaf- eights, dry matter, crude protein and sugar ntents and incidence of *Cercospora* and yellowing. ne sugar-beet varieties Beta 242/53 and Buszinsky ve the best overall yields. Except at Admont and aiseran, Zentaur, a fodder-beet variety, gave the st yields as judged by root-weight, dry matter d sugar content. Zentaur yielded best when the and density was between 100,000 and 130,000 ants per hectare. The highest root yields were tained by two applications of calcium-ammonium trate at the rate of 800 kg./ha. and liquid manure the rate of 300 kg./ha. The highest leaf yields ere obtained by two applications and one applica- on, respectively, of calcium-ammonium nitrate at e rate of 800 kg./ha.; liquid manure did not in- ease leaf yields. Hoffmanns gelb swede gave the st root yields at over 1000 m. a.s.l. while Wil- lmsburger had the highest sugar content.—M.A.

68 McFARLANE, J. S. and PRICE, C. **A new non-bolting, curly-top-resistant, sugar beet variety, U.S. 75.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 384-6. [Sug. Pl. Invest. Div., Pl. Industr. Bur., U.S. Dep. Agric.]

trials in California, U.S. 75, in its resistance to lting, was similar to U.S. 56/2 and considerably perior to U.S. 22/3 and U.S. 15. In resistance to rly-top virus, U.S. 75 was slightly inferior to S. 22/3, but considerably superior to U.S. 56/2 d U.S. 15. In resistance to downy mildew [*eronospora schachtii*], U.S. 75 was superior to S. 22/3 and U.S. 56/2. Sugar yields of U.S. 75 ere fully comparable to those of the common mmercial varieties, though its sugar content is mewhat below that of U.S. 15 and U.S. 56/2.— .B.

1369 PETERSON, D. F. and CORMANY, C.E. **A new leaf-spot-resistant variety [of sugar-beet].** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 382-3. [Exp. Sta., Holly Sug. Corp., Sheridan, Wyoming]

In trials in Arkansas, M.W. 111 and M.W. 131 outyielded a commercial check variety U.S. 215 × 216 by an average of 13 and 21%, respectively. M.W. 111 was tested over a 5-year period and M.W. 131 over a 3-year period. Leaf spot [*Cercospora beticola*] readings for the commercial variety and M.W. 111 and 131 were 5.2, 2,8 and 1.9, respectively, on a scale 0-10 where 0 = immune and 10 = susceptible. —P.J.B.

1370 DOXTATOR, C. W. and BAUSERMAN, H. M. **Chemical constituents of five varieties [of sugar-beet] grown in six mid-western factory areas.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 307-13, bibl. 3. [Amer. Crystal Sug. Co., Rocky Ford, Colo]

The results are given of studies at a total of 6 locations in Colorado, Nebraska, Iowa and Minnesota during 1951 on the root and sugar yield and content of sucrose, Na, K, Mg, Ca, Cl, ash, sulphate and total N and purity of juice of 5 varieties of sugar-beet. The variety with the highest mean sucrose content (15.77%) was 6-419-X, which also had the highest Mg and total N content and the lowest Na and K content. The variety 8-601-0 had the lowest mean sucrose content (14.8%) and Mg content and the highest content of Na and Cl. There were considerable differences between the values for all characters at different locations, from which it was concluded that location was the most important factor in determining yield and purity of juice. In studies on the constitutents concerned with juice purity, there was a positive correlation between sucrose and Ca content and a negative correlation between sucrose and Na and Cl content. Na content was negatively correlated with Ca content and positively correlated with Cl content.— P.J.B.

1371 WALKER, A. C. and others. **Measurement of the difference between "sugar type" and "yield type" sugar beets.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 426-33, bibl. 6. [Internat. Min. and Chem. Corp., Woodland, Calif.]

Methods are described for calculating the direction of the most significant differences between varieties when values for sucrose content, root weight and glutamic acid content are available. The transformation of axes from sucrose content, root weight and glutamic acid content to storage potential, growth potential and nitrogen status, are depicted as an orthogonal projection of a 3-dimensional graph. It is shown from data obtained in California, that as varieties tend to approach high root-yield/low sucrose content varieties in type, root weights increase by 4.7 tons per ac. for each percent decrease in sucrose content and that the gross sucrose yields rise as the storage potential of the varieties falls. The high sugar content/low root-yield types of sugar-beet have a high storage potential and a high glutamic acid content. Varieties of the low sugar content/high root-weight type have a low storage potential and a low glutamic acid content. It is shown that the glutamic acid content of the roots increases by 16% for every rise of 1% in sucrose content, as varieties move toward the high sucrose content/low root-weight type. Varieties with a high growth potential had a high glutamic acid content, which more than compensated for the low glutamic acid content correlated with a low storage potential.—P.J.B.

1372 NELSON, R. T. and DEMING, G. W. **Effect of bolters on yield and sucrose content of sugar beets.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 441-4. [Exp. Sta., Gt. West. Sug. Co., Longmont, Colo]

Studies are reported on root weight, sucrose content and coefficients of apparent sucrose purity of sugar-beet which bolted early in the season and set seed and that which bolted late and set no seed, as compared with normal, non-bolting sugar-beet. Early-bolting plants produced about half the root-weight of non-bolting plants. Plants which bolted, but did not fully mature seed, or only reached the flowering stage, had root-weights comparable to those of normal plants. The sucrose content of bolting plants was similar to, or slightly lower than, that of normal plants. Undisturbed bolting plants did not affect the root weights, or sucrose content of adjacent plants. Breaking off the seed stalks of early-bolting plants considerably reduced the sucrose content of the roots, compared with where the stalks were not broken. Apparent sucrose purity was not affected by bolting.—P.J.B.

1373 PENDLETON, R. A. **Population and distribution of sugar beets and table beets as related to seed production.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 454-8, bibl. 1. [Oregon Agric. Exp. Sta., Corvallis]

Sugar-beet for seed was sown during the 1949-50 season in western Oregon on 3 August in rows, 12, 16, 20 and 24 in. apart, with the stands unthinned, and thinned to 3 and 6 in. spacing in the row. The stands were irrigated. Seed yields varied from 3600-3900 lb. per ac., the differences in no case being significant. Highest mean seed yields were obtained from rows spaced 16 in. apart, while the highest individual seed yields came from rows spaced 24 in. apart, with the stands unthinned. Total root weights at harvest ranged from 6.6 tons per ac. for unthinned plants in 24 in. rows, to 11 tons per ac. for plants in 12 in. rows, with 6 in. spacing between plants in the row. There were no significant differences in the germination of seed at any spacing treatment.—P.J.B.

1374 WRAAE-JENSEN, H. Forsøg i frøafgrøde 1952. [**Trials with seed crops (in Denmark), 1952.**] *Dansk Froavl* 1953, **36,** No. 8, 105-13

The results are given of a number of trials in Denmark during 1950-2 on the use of Systox and Pestox 3 for the treatment of seed crops of beet. Treatment up to 5 times with Systox and 3 times with Pestox during the season considerably increased seed yields and decreased the incidence of virus yellows and mosaic in the crops. Better results followed the use of Systox than Pestox 3.—P.J.B.

1375 BUNIN, V. N. and DANILOVOVÁ, T. D. Vliv bóru a růstových stimulátorů na výnos semene cukrovky. [**The effect of boron and growth stimulators on seed yield of sugar-beet.**] *Social. Zeměd.* (*Social. Agric.*) 1953, **3**, No. 4, 402-5.

1376 HILLS, F. J. and LEACH, L. D. **The effect of certain soil-row treatments on damping-off of sugar beet seedlings caused by specific fungi.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 549-53, bibl. 4. [Univ. California, Davis]

Greenhouse studies showed that spraying Vancide 51, Arasan SF and Phygon XL in the seed row at the the time of sowing resulted in considerably better seedling emergence than where no treatments were made and gave good control of damping-off pathogens, including *Pythium ultimum*, *Rhizoctonia solani*, *P. aphanidermatum* and *Aphanomyces cochlioides*. This technique is thought to have considerable possibilities as a field treatment. The treatments gave better control of the above pathogens than standard seed treatments.—P.J.B.

1377 PARKER, C. **Chemical weed control in sugar-beet.** *Fung. Insect. Res. Co-ord. Serv. Sec. C. Herbicides* 1953, No. 8, 29-37, bibl. 61.

This review summarizes the results of recent investigations into the use of chemicals in the control of weeds in the sugar-beet crop at post-emergence and pre-emergence stages. Chemicals which appear to give a fair measure of control are: for post-emergence treatments, NaCl, $NaNO_3$ and perhaps mixtures of the two, applied as concentrated as possible at 100 gallons per acre with a wetter after the 3-4 leaf stage has been reached; for post-emergence treatments, oils fortified with small quantities of PCP (pentachlorophenol) or IPC (isopropyl phenyl carbamate) and Endothal activated with ammonium sulphate are suggested.—M.A.

378 NELSON, R. T. **Trials with herbicides for weed control in sugar beets.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 121-5, illus. [Gt. West. Sug. Co. Agric. Exp. Sta., Longmont, Colo]

n trials with a number of herbicides for controlling olunteer grain and wild oats [*Avena fatua*] in ıgar-beet, IPC, Cl IPC, dichloral urea, Endothal nd TCA gave good results when applied to the surace of the seed-bed and disced in, immediately efore sowing the sugar-beet. Effective rates of pplication were 6 lb. per ac. for IPC and Cl IPC, .6 lb. per ac. for Endothal, and 15 lb. per ac. for ichloral urea and TCA. Endothal caused some emporary retardation of the growth of sugareet.—P.J.B.

379 DOWNIE, A. R. and others. **Results of experiments on chemical weed control in sugar beets.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 128-33, bibl. 2. [Amer. Crystal Sug. Co., Rocky Ford, Colo]

re-emergence spray treatments of sugar-beet elds in Iowa, Nebraska and Colorado with 90% a TCA at a rate of 5 - 7 lb. per ac. in 10 - 30 gal. pray volume per ac., gave good control of annual rasses, including green foxtail (*Setaria viridis*), ellow foxtail (*S. lutescens*), barnyard grass *Echinochloa crus-galli*) and annual bluegrass (*Poa nnua*), where rainfall occurred after the spray eatments. Irrigation was less effective than atural rainfall in carrying the TCA down to the oot zone of the grasses. At the rates of TCA treatent quoted, there was little, if any, effect on the ucrose content of the sugar-beet, though the root-eight of the crop was slightly increased by the eatment.—P.J.B.

380 GERHOLD, N. R. and others. **Soil treatment for control of black-root of sugar beets.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 554-6, illus. [Colorado A. and M. Coll., Fort Collins]

n studies with a number of fungicides applied to e soil at the same time as sugar-beet seed was wn, so that the materials were incorporated in e soil around the seed, the use of Arasan, Dithane 78 and Dow D.H.A. at a rate of 4 lb. per ac. sulted in stands of 86, 79 and 80 plants per plot, mpared with 62 for untreated controls, the fferences being significant. In damp, but not in y, soil conditions, Ceresan M at a rate of 1 lb. per . was as effective as Arasan at 4 lb. per ac. Trials er a 3-year period showed that Arasan was the ost consistently effective material for controlling lack root of sugar-beet seedlings (caused by *ythium*, *Rhizoctonia* and *Fusarium* spp.) and for creasing sugar-beet stands.—P.J.B.

81 MONTANARI, V. La lotta contro la cercospora della barbabietola da zucchero. [**The control of Cercospora beticola on sugar-beet.**] *Agricoltura d. Venezie* 1953, **7,** No. 5, 245-8, bibl. 1.

An account is given of trials carried out in Italy to control *Cercospora beticola* leaf spot on sugar-beet with copper preparations. [See also *Fld Crop Abstr.* 5 : 1176.]—E.B.O.

1382 MARGARA, J. Comportement des variétés de betterave sucrière a l'égard ducer cospora problemès que pose l'obtention de types résistants. [**The behaviour of sugar-beet varieties in relation to their resistance to Cercospora beticola.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. B. Ann. Amélior. Pl.* 1952, **2,**215-29, bibl. 15. [Versailles]

Thirty commercial varieties of sugar-beet were studied in relation to their susceptibility to *Cercospora beticola*. The American varieties US 215 × 21613, US 215 × 216, the German variety Klein Wanzleben R.C., Beta Y 19 (from Hungary) and an Italian variety RD2 (Rovigo) proved least susceptible to the disease.—M.A.

1383 JONES, E. W. and others. **Experiments on control of the sugar beet root maggot.** *Proc. Amer. Soc. Sug. Beet Technol 1952* 490-6, bibl. 5, illus. [Idaho Agric. Exp. Sta., Moscow]

In trials in Idaho over a 2-year period, soil treatments in which Aldrin, Dieldrin and Heptachlor were applied in manures, soil fumigation with ethylene dibromide on 1 June, and seed treatment with 0.5 lb. Aldrin, or 0.25 lb. Heptachlor per 100 lb. seed, all gave good control of sugar-beet root maggot (*Tetanops myopaeformis*) and raised root yields by up to 6 tons per ac. above those of untreated controls.—P.J.B.

1384 SCHUSTER, M. L. **Host range of the root knot nematode of western Nebraska.** *Proc. Amer. Soc. Sug. Beet Technol 1952* 519-24, bibl. 15. [Nebraska Agric. Exp. Sta., Lincoln]

Studies on 62 species of plants showed that *Brassica* spp., carrot, safflower (*Carthamus tinctorius*), sugar-beet, fireweed (*Kochia scoparia*), onion, parsnip and parsley (*Petroselinum hortense*) were moderately or severely attacked by the root-knot nematode (*Meloidogyne* spp.)—P.J.B.

1385 SCHUSTER, M. L. and HARRIS, L. **Effects of crop rotation on the incidence of root-knot disease of sugar beets in western Nebraska.** *Proc. Amer. Soc. Sug.-Beet Technol. 1952* 511-18, bibl. 18. [Nebraska Agric. Exp. Sta., Lincoln]

Studies are reported on the incidence of root-knot nematode (*Meloidogyne* spp.) in sugar-beet grown continuously and in 2-, 3-, 4- and 6-year rotations with different crops, including wheat, potatoes, oats, barley, maize, beans, lucerne and sweet clover

[*Melilotus alba*]. The short rotations were continued for a period of 22 years and the long rotations for up to 35 years. Length of rotation was the major factor in controlling the nematode. The incidence of root-knot nematode decreased sharply as the length of rotation increased above 2 years, though in some cases, incidence of root-knot nematode was severe in 3- and 4-year rotations, particularly the following: sugar-beet/barley/sweet clover/potatoes and two 4-year rotations of sugar-beet, barley/lucerne/lucerne/potatoes, and sugar-beet/barley/sweet clover/sweet clover/potatoes. The lowest incidence of infection occurred in the following 6-year rotation: sugar-beet/barley/lucerne/2 years' lucerne/potatoes/beans. Applications of farmyard manure decreased the incidence of nematode attack in 2-year rotations, while artificial manures (N + P) reduced the incidence of attack in continuous sugar-beet, the 2-year rotations and in 4-year rotations which included sweet clover. The sequence of cropping in the rotation had no noticeable effect on the incidence of nematode attack.—P.J.B.

1386 MAST, A. A. and MORROW, W. B. **Control of the salt marsh caterpillar in sugar beets grown for seed.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 507-10, bibl 1. [Western Seed Prod. Corp., Phoenix, Ariz.]

For preventing large-scale migrations of the salt marsh caterpillar (*Estigmene acraea*), aluminium foil strips set vertically in the soil were highly effective. For controlling caterpillars in sugar-beet fields, spray treatment with 3 lb. Toxaphene in emulsifiable oil in 30 - 40 gal. water per ac. was very effective.—P.J.B.

1387 ALDROVANDI, A. Gli insetti nella campagna bieticola 1952. [**The insects on the sugar-beet crops of 1952.**] *Industr. saccar. ital.* 1952, **45,** No. 9-10, 338-43, illus.

This is a review of the methods adopted in Italy for controlling insect pests on sugar-beet.—E.B.O.

1388 HULL, R. and GATES, L. F. **Experiments on the control of beet yellows virus in sugar-beet seed crops by insecticidal sprays.** *Ann. appl. Biol.* 1953, **40,** No. 1, 60-78, bibl. 5. [Rothamsted Exp. Sta. (Dunholme Fld Sta., near Lincoln)]

1389 WATSON, D. J. and WATSON, Marion A. **Comparative physiological studies on the growth of field crops. 3. The effect of infection with beet yellows and beet mosaic viruses on the growth and yield of the sugar-beet root crop.** *Ann. appl. Biol.* 1953, **40,** No. 1, 1-37, bibl. 17. [Rothamsted Exp. Sta., Harpenden, Herts.]

1390 RIRIE, D. and others. **The effects of maleic hydrazide and 2,4-D on sugar beet growth and sugar content in certain field experiments.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 86-9, bibl. 3. [Calif. Agric. Exp. Sta., Davis]

Trials were carried out to determine the effects of foliar sprays of 0.3% maleic hydrazide and 0.025% 2,4-D on sucrose accumulation and root yields of sugar-beet. The materials were applied on 4 September and harvest dates were 25 September, 16 October and 6 November. The sugar-beet was grown on soils known to produce roots with very low sugar content. The 2,4-D treatments had no effect at the first harvest date, but significantly increased root weights above untreated controls at the second and third harvest dates, and reduced the sugar content of the roots. The maleic hydrazide sprays significantly increased the sugar content of the roots at all harvest dates, though its maximum effect was evident 21 days after treatment, when it raised the sugar content by an average of 1.3% over controls. Maleic hydrazide did not appear to increase root weights and the sugar yield of plants so treated exceeded that of the controls only at 21 days after treatment.—P.J.B.

1391 PETO, F. H. and others. **Effects of pre-harvest sprays of maleic hydrazide on sugar beets.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 101-7, bibl. 2. [B.C. Sug. Refining Co., Vancouver, B.C.]

In trials in Alberta, the foliage spraying of sugar-beet with 3000 ppm. solutions of maleic hydrazide on 30 July severely reduced root weights, but significantly increased the sugar content of the roots, compared with controls. Later treatments had no appreciable effect on root weight or sugar content. Where the tops of sugar-beet were subjected to freezing treatment on 16 August, root weight and sugar content were severely reduced at harvest 36 days later; similar treatments made on 2 October had relatively less effect on root weight and sugar content. Crops treated with maleic hydrazide on 18 September, followed by top-freezing on 2 October, had 7.7% higher sugar content in the roots, 4.5% higher root weights and 5% higher top weights 30 days after the maleic hydrazide treatment than crops frozen, but not treated with maleic hydrazide. Maleic hydrazide treatments made prior to freezing had no apparent effect on the subsequent root weights of unharvested crops, but somewhat reduced the amount of top re-growth and conserved sugar in the roots, compared with where no maleic hydrazide was applied. Maleic hydrazide applied to sugar-beet on 22 September, before harvest on 5 and 16 October and 2 November, had no significant effect on root weight or sugar content at any harvest date. In storage trials over a 34-day period, the roots of ops treated with maleic hydrazide stored better, it not significantly so, than the roots of untreated ops.—P.J.B.

92 BEJNAR, W. Krzyzówki wegetatywne u buraków. [**Vegetative hybrids in beets.**] *Roczn. Nauk Roln.* 1952, **61,** 249-58, bibl. 3, illus.
ee *Pl. Breed. Abstr.* 23 : 2026.]

93 ULRICH, A. **Growth and development of open-pollinated, hybrid and inbred sugar beet varieties in controlled climates.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 73-84, bibl. 10. [Earhart Pl. Res. Lab., Pasadena, Calif.]
t studies were carried out on the growth of 2 en-pollinated, 4 inbred and 2 hybrid sugar-beet rieties grown in 6 controlled climates, with a tural day-length of 10.6 - 14.3 hr. (in California), of 8 hr., with temperatures of 20°, or 26°C. from .m. to 4. p.m., and 14°, 20°, or 26°C. from 4 p.m. 8 a.m. There were considerable differences be-een varieties in their response to the different mates. The greatest mean sucrose production llowed exposure to normal day-lengths and tem-ratures of 20°C. in daylight and 14°C. in dark-ss (48.5 g. per pot), or to 26°C. in daylight and 'C. in darkness (48.0 g. per pot). Under 8 hr. y-lengths, sucrose production in the different nperature regimes varied from an average of 7 to 18.6 g. per pot. The lowest sucrose yields me from plants exposed to an 8 hr. day-length h a continuous temperature of 26°C. (11.7 g. gar per pot). Where the temperature from .m. to 4 p.m. was reduced to 20°C. and that from .m. to 8 p.m. to 14°C., sugar production per pot reased to 18.6 g. Root weights, sucrose content, o weight and weight and number of living leaves llowed the same trend as sugar production in ponse to the different climates. Total leaf mbers were the same in plants grown at all tem-ratures, except the warmest ; the life expecta-n of the leaves of plants grown under long day-gths, or in cool day and night temperatures, s much greater than that of leaves grown in h temperatures with short day-lengths. Hybrid our was evident in cool, but not in warm tem-ratures. The open-pollinated varieties U.S. 22/3 d G.W. 304 differed, in that G.W. 304 produced ch more sugar than U.S. 22/3 in a cool climate l with natural day-lengths ; in a warm climate l natural day-lengths, the performance of U.S. 3 much more nearly resembled that of G.W. 304. .J.B.

4 STEWART, D. and CAMPBELL, S. C. **The dispersion of pollen in sugar-beet seed plots.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 459-69, bibl. 7. [Sug. Pl. Invest. Div., Pl. Industr. Bur., U.S. Dep. Agric., Beltsville, Md]
In trials using identifiable sugar-beet hybrids in row progenies of a recipient variety, the percentage of hybrid seedlings in the row progenies of the recipient declined logarithmically as the distance from the pollinator increased. In 4 ft. rows, there was a reduction of 16.28% for each 4 ft. interval.—P.J.B.

1395 GASKILL, J. O. **Induction of reproductive development in sugar beets by photothermal treatment of young seedlings.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 112-20, bibl. 3. [Colorado Agric. Exp. Sta., Fort Collins]
This is a detailed version of the paper reported in Abs. 175. Induction in young sugar-beet seedlings is obtained by exposure to temperatures of 48°F. for 10 weeks in continuous artificial light. Moderate to warm temperatures, with continuous light, are maintained during the pre- and post-induction periods. The complete cycle from sowing to seed maturity was completed within 6 months under these conditions, in the case of a relatively slow-bolting sugar-beet strain. There was a marked relationship between the age of the seedlings at the start of the induction period and seed yield ; the older the seedlings before the induction treatment, the higher the seed yields. A pre-induction period of 28 days resulted in higher seed yields than did a period of nil, 4, or 14 days, though the seed yield differences between the 14- and 28-day pre-induction treatments were not great.—P.J.B.

1396 HULL, H. M. **Carbohydrate translocation in tomato and sugar beet with particular reference to temperature effect.** *Amer. J. Bot.* 1952, **39,** No. 9, 661-9, bibl. 28, illus.
The purpose of this paper was to show certain effects of localized temperature upon carbohydrate translocation in tomato and sugar-beet plants. The experiments showed that glucose was absorbed by the leaves more readily than sucrose, and, at low temperatures, equal or greater translocation was recorded.—M.A.

1397 ULRICH, A. and HILLS, F. J. **Petiole sampling of sugar beet fields in relation to their nitrogen, phosphorus, potassium and sodium status.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 32-45, bibl. 11. [Univ. California, Berkeley]
A detailed study was made over a 3-year period of the technique used in petiole sampling of sugar-beet crops to determine their nutrient status. From the results, it was considered that to obtain the greatest gains in precision, it was better to increase the number of samples taken from a given field than either to increase the number of petioles sampled, or to increase the number of analyses of each sample. By determining the proportion of plants deficient and not deficient in a given ele-

ment in a field, a better evaluation of the nutritive status of the crop can be arrived at than by the use of mean nutrient values, alone.—P.J.B.

1398 McQueen, G. R. **Effect of various nutrient levels of soil and foliar spray applications on sugar beet yields.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 46-9, bibl. 1. [Fmrs and Mnfctrs Beet Sug. Ass., Saginaw, Mich.]

Trials in Michigan were carried out to determine the effect of different N, P and K treatments, and the effect of different P and urea foliar sprays in combination with manurial P treatments, on the root and sugar yields of sugar-beet and on the sucrose content of the roots. Crops receiving 500 lb. N per ac. had a sucrose content of 14.3% and yielded 4920 lb. sugar per ac., compared with 18.8% sugar content and 5837 lb. sugar per ac. for crops receiving no N. Heavy K treatments also tended to lower the sucrose content of the roots and sugar yields, but to a lesser degree than the N treatments. In further trials, the following treatments were made to sugar-beet: (a) 60 lb. P_2O_5 per ac., (b) 120 lb. P_2O_5 per ac., (c) 120 lb. P_2O_5 per ac. + 10 successive P sprays (saturated superphosphate solution every 7 days), (d) 120 lb. P_2O_5 per ac. + 5 successive P sprays every other week, (e) 120 lb. P_2O_5 per ac. + 2 sprayings with a saturated solution of urea. Root yields were 13.3 tons per ac. for untreated controls and 16.3, 16.7, 18.7, 17.7 and 17.8 tons per ac., respectively, for the different treatments in the order given. Sugar yields were 4423 for the controls and 5562, 5725, 6462, 5845 and 6068 lb. per ac., respectively—P.J.B.

1399 Walker, A. C. and Hac, Lucile, R. **Effect of irrigation practices upon the nitrogen metabolism of sugar beets.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 58-66, bibl. 14. [Internat. Min. and Chem. Corp., Woodland, Calif.]

The results are given of trials in Utah to determine the response of sugar-beet to N under different soil-moisture conditions following the application of irrigation water in furrows and by sprinklers. Given applications of N raised the root yield and glutamic-acid content of sugar-beet as soil moisture supplies were increased, this effect being greater following sprinkler irrigation than following furrow irrigation. A method for measuring the N status of sugar-beet is presented. The use of this method showed that even under relatively dry soil conditions, large losses of available N could be caused by irrigation. The concepts of N status, growth potential and storage potential are used to explain the 4 possible correlation patterns between the sugar content, root weight and glutamic acid content of sugar-beet.—P.J.B.

1400 Wittwer, S. H. and Hansen, C. M. **Son effects of preharvest foliage sprays maleic hydrazide on the sugar content a storage losses of sugar beets.** *Proc. Amer. S Sug. Beet Technol. 1952* 90-4, bibl. [Michigan Agric. Exp. Sta., East Lansin

Spray applications of different formulations maleic hydrazide (2500 ppm.) made to sugar-be on 7, 20 and 28 September, before harvest on 1 18 October, raised the sucrose content by up 10% above untreated controls. Notes are given the effect of pre-harvest maleic hydrazide spra on storage losses in the roots. Except for applic tions of the Na salt of maleic hydrazide plus wetting and sticking agent, made on 20 Septemb no significant decreases in storage losses we noted, compared with untreated controls. Stora conditions in all cases were very unfavourabl [See also *Fld. Crop Abstr.* 5 : 492.]—P.J.B.

1401 Stout, M. **Two years' results evaluati effect of preharvest sprays of maleic hydr zide on respiration and spoilage of sug beets.** *Proc. Amer. Soc. Sug. Beet Techn 1952* 95-100, bibl. 8. [Sug. Pl. Inves Div., Pl. Industr. Bur., U.S. Dep. Agric.]

In the studies reported, 2 series of trials we carried out in which concentrations of 1000, 25 and 5000 ppm. of maleic hydrazide (diethanolami salt) were applied as pre-harvest sprays and as ro dips to sugar-beet. There was no evidence that t treatments affected sugar accumulation in t roots, or decreased sugar losses or top regrow during storage for up to 110 days in cella Sampling errors when determining root-sug losses during storage by direct analysis were mu greater than where losses were calculated fro respiration rates.—P.J.B.

FODDER-BEET

1402 Northern Ireland. Monthly Report the Ministry of Agriculture. **Fodder be variety trial.** *Mon. Rep. Minist. Agric. Ire.* 1953, **28,** No. 1, 15-16

An experiment to compare total yield of the cro and the yield of dry matter obtained from varieties of fodder-beet was carried out in 195 Pajbjerg Rex X gave the highest yields of roo and tops and Hunsballe X the highest percenta of dry matter, but both these varieties were difficu to lift and clean due to their much-branched ro systems. Red Otofte X, however, produced part cularly well-shaped roots and gave average yield —M.A.

1403 Jaehnl, G. Ergebnisse der Rübenversuc des Jahres 1951. [**Results of beet trials, 1951**

VersErgebn. Bundesanst. alp. Landw., Admont 1952, No. 16, pp. 60.

dder-beet : variety trials were made in 5 localities
Austria at altitudes ranging from 640 to 1200 m.
the 5 varieties tested, little difference was dis-
nible in beet yield and yield of dry matter, but
f yield varied in the different localities and attack
Cercospora or frost practically destroyed the
iage in two of them. Results in the other 3
alities harmonized, showing Rosa Beta had a
f yield significantly higher than the other
ieties. A trial of planting distances and manurial
atments at Admont, in which 3 varieties were
d, showed that narrow drills (30 and 40 cm.)
ve higher yields than 55 cm. drills.

Half-sugar-beet : variety trials were made in 4
alities at altitudes ranging from 640 to 1000 m.
lative yield was very consistent and the variety
ntaur always gave the highest yield. At Admont,
ona gave the highest leaf yield.

Sugar-beet : variety trials in 8 localities at
tudes ranging from 430 to 800 m. did not give
h uniform results as the fodder- and half-sugar-
t trials, and absolute yield was in part un-
sfactory, owing to the weather in the spring.
rial of planting distances showed narrow drills
cm.) gave better yields per ha. than wide drills
- 61 cm.). The percentage dry matter differed
e with planting distance, but the percentage
ar is stated [with some reserve] to increase
newhat with increasing width of drill.—G.M.R.

RNIP

4 NETHERLANDS. Institute for Research on Field Crop Varieties. Bericht over rassenkeuze. No. 146. Stoppelknollen 1953. [**Report on choice of varieties. No. 146. Turnips 1953.**] *LandbVoorl.* 1953, **10,** No. 6, Suppl. 12.

ut 80,000 ha. of turnips are grown in the
herlands, chiefly on sandy soils. Comparative
s of 14 turnip varieties were made in the years
-52 and the results are tabulated under the
wing headings : persistence of green colour in
leaf, frost-resistance, adherence of soil to the
, resistance to finger-and-toe disease [*Plas-*
iophora brassicae], dry-matter content of the
and leaf and total yield of dry matter. The
combinations of desirable qualities were
d in the 4 varieties Jobe, Halflange Blauwkop
, Siloga and Gelria, all belonging to the group
varieties known as “medium-length white
le-tops.” Jobe gave the highest yield of dry-
er per ac. and had an average dry-matter
ent in the root of 8.8%. The variety Siloga had
ighest average dry-matter content in the root
1%). The varieties Siloga and Gelria, intended
ate harvesting, were noteworthy for the per-
nce of the fresh condition of their leaves late into the harvesting season, and for their resistance to frost. The percentage of the total area under turnips in the Netherlands occupied by the group of varieties “medium-length white purple-tops” increased from 60% in 1947 to 90% in 1952.—W.J.B.

POTATO

1405 JAEHNL, G. Ergebnisse der Kartoffelversuche des Jahres 1952. [**Results of (Austrian) potato trials for 1952.**] *VersErgebn. Bundesanst. alp. Landw., Admont* 1952, **19,** pp. 17.

Two variety trials, 2 tuber-cutting trials, and 3 trials on the performance of seed potatoes from parent stock derived from cut tubers were laid down in 1952. Of the early varieties, Böhms Allerfrüheste gave the highest yields, while of the late varieties, Ackersegen N.Ö., Agnes and Voran were the best yielders. In the tuber-cutting experiments, large tubers gave higher yields than normal seed potatoes, and cut portions of tubers, with the apical bud included, gave higher yields than normal, whole seed potatoes. Seed from parent stock derived from planting the cut portions of tubers, which included the apical bud gave a 7% higher yield than seed from parents derived from normal seed.—M.A.

1406 JACOB, W. C. and others. **The influence of irrigation on the yield and quality of potatoes on Long Island.** *Amer. Pot. J.* 1952, **29,** No. 12, 292-6, illus. [Cornell Univ., Ithaca, N.Y.]

An account is given of trials carried out over 3 years (1949-51) in which potato plots were irrigated for about 10 weeks each year until maturity. From the results it was concluded that 1.2-2.2 in. of water per irrigation, applied frequently enough to prevent excessive drying of the soil, was adequate in Long Island. It was also shown that irrigation, which gives good increases in yield, very seldom reduces the specific gravity of potatoes and is more likely to increase it.—E.B.O.

1407 DODDS, K. S. and HAWKES, J. G. **Potatoes in the tropics.** *Paper read at Internat. hort. Congr. Sept., 1952* 1953, pp. 7. [Agric. Res. Coun., Potato Genet. Sta.]

In tropical South America, varieties of *Solanum tuberosum* ssp. *andigenum* give a fair yield of potatoes in about seven or eight months at altitudes of between 10,000 ft. and 13,500 ft. At these altitudes, European and North American varieties, whether early or late-maturing, are not able to thrive. The yields of *andigenum* varieties fall progressively with drop in altitude and are very low at 7000 ft. unless mulching is practised. European and North American varieties yield well [in the tropics] from about 1300 ft. to 8000 ft.—From authors' summary.

1408 TERMAN, G. L. and others. **Effect of date and method of kill on yield, specific gravity and other quality factors of Maine potatoes.** *Amer. Potato J.* 1952, **29,** No. 12, 279-89, bibl. 10. [Maine Agric. Exp. Sta., Orono]

The results from field-plot trials, conducted in 1950 and 1951, showed that yields of tubers increased as long as any portions of the haulms remained alive. Therefore, slower methods of killing resulted in higher yields than did more rapid methods. The specific gravity of tubers grown during the warmer season of 1950 reached a maximum in mid-August, but that of tubers grown during the cooler, more rainy season of 1951 increased as long as the haulms remained alive. In 1951, therefore, slower methods of killing resulted in a higher specific gravity of the tubers. The susceptibility of the tubers to skinning decreased as the haulms matured. Early in the harvest season, skinning was reduced considerably by harvesting 20 days, rather than 10 days, after the date of haulm-killing. The susceptibility of the tubers to mechanical injury increased considerably with lower temperature during harvesting and testing. The tubers were also injured somewhat more easily with advance in maturity. Shrinkage, or loss in weight, during storage was lower for more mature tubers than for those harvested earlier in the season.—From authors' summary.

1409 TURNER, R. **Farm labour studies No. 3. Potato harvesting: some aspects of the labour organization.** *Rep.* 7. *W. Scot. agric. Coll. Econ. Dep.* 1953, pp. 19.

1410 CULLEN, J. C. **Potato varieties** [**in Great Britain**]. *J. nat. Inst. agric. Bot.* 1952, **6,** No. 2, 315-34. [Paper read at the Crop Conference held at the Cambridge Union Society on 16th and 17th December, 1952.]

1411 DEMEL, Johanna. Ergebnisse der Kartoffelsortenversuche 1951. [**Results of the 1951 potato variety trials (in Austria).**] *Ber. Arbtag. Bundesanst. alp. Landw., Admont* 1952, 147-54. [Bundesanst, Admont]

The results from the 1951 trials are tabulated. Of the early and medium-early varieties, Böhms Allerfrüheste Gelbe, Bintje, Jakobi and Oberarnbacher Frühe gave the best yields. Only Jakobi produced a high proportion of small tubers. In the medium-late class, the variety Agnes yielded approximately 30% above the mean yield of the class. The late varieties were classified into those with a high starch content for industrial use and those with a lower starch content for the table. Falke had the highest starch content, but Panther with a slightly lower starch content gave a higher yield of tubers. Voran NL and Ackersegen N.Ö. were the best yielders in the table class.—M.A.

1412 PETERSSON, G. and SVENSSON, E. Hel elle
kluven sättpotatis? [**Whole or cut potat
setts?**] *Lantm. Svenskt Land* 1953, **37,** N
18, 432-4. [Ugerups Försöksgård, Swede

Studies are reported in which the yields of who
and cut potato setts were compared over a 10-yea
period. A number of varieties was used. The weig
of cut and whole setts was 50 g. in both cases an
the cut tubers were stored in shallow boxes fo
1 week under cover before planting. Over the tri
period, the cut setts yielded an average of 6.7
less in weight of tubers than did the whole setts
in no case did the yield of cut setts exceed that
whole setts by more than 1%. There we
differences between varieties in respect of the
yields following the cutting of the setts. In tria
with 5 varieties during 1942-6, the yields of Vora
and Wekaragis were relatively little effected b
cutting the tubers, while yields of Starkereiche
Parnassia and Alpha were considerably reduced b
this practice. The yields of given varieties followin
cutting of the setts varied considerably from yea
to year; e.g., in 1942, Wekaragis gave the highe
yield of the 5 varieties following cutting of the sett
while in 1944, it gave the lowest yield of all va
ieties. In a second group of trials during 1947-5
Ackersegen gave slightly greater average yiel
following cutting of the setts than where who
setts were used; the tuber yields of all the oth
varieties used were reduced following cutting of t
setts, the reductions being less for President an
Ostbote than for Alpha and Bintje. Yield reductio
following the planting of cut setts were largel
due to failures in the row. Cut setts produced
higher percentage of large tubers than did who
setts.—P.J.B.

1413 JAEHNL, G. Über Schneiden und Vorkeime
von Saatkartoffeln. [**Cutting and pre-sprou
ing of seed potatoes.**] *Veröff. Bundesanst. al
Landw., Admont* 1952, No. 6, 90-123, bib
7, illus.

Details of the results from combinations of 1
different treatments in replicated experiments fro
1949-51 on three varieties of potato, Böhms Alle
früheste, Frühbote and Naglerner Frühgold, a
given. The treatments were :– tubers whole (co
trol), tubers cut crosswise, tubers cut lengthwis
tubers cut 14 days before planting, tubers cut ju
before planting, tubers pre-sprouted in light an
tubers pre-sprouted in darkness. In all cases cutti
of the seed potatoes resulted in lower yields. The
were no significant differences between potato
not pre-sprouted, those sprouted in the light an
those sprouted in the dark.—M.A.

1414 DUTT, B. K. and GUHA THAKURTA,
**Utilization of freshly harvested potato tub
in the cultivation (as seed).** *Trans. Bose R
Inst.* 1949-51, **28,** 79-97, bibl. 14, illus.

ie effects of different liquid and gaseous chemical
eatments on the length of the dormancy periods
freshly harvested Nainital and Darjeeling red
ind potatoes were determined. Treatments with
% solutions of sodium, potassium and ammonium
iocyanates and 1% ethylene chlorhydrin
ortened the dormancy periods of halved tubers by
out 5 - 6 weeks while 1% thiocyanate solutions
d 0.5% chlorhydrin solution were less effective.
rietal difference in reaction to treatment was
all. Ethylene chlorhydrin was more effective
a gas than as a solution in breaking dormancy
d acted more rapidly at a concentration of
. c.c. per l. than at 1 c.c. per l. In all experiments
action of the chemicals in hastening the sprout-
of the potatoes was hastened by the cutting
the tubers. Further trials showed that immature
ers detached from the parent plant germinated
re rapidly than mature ones and that their
idity of germination was hastened by cutting
ompanied by chemical treatment as described
ove. The hypothetical processes involved in the
aking of dormancy by various chemical treat-
nts [including treatment with CO_2 and O_2] are
cussed.—W.J.B.

45 IRION, W. von and FISCHNICH, O. Über stoffliche Umwandlungen in "Rindite" behandelten Kartoffelknollen in den einzelnen Phasen der Keimung. [**Changes in the composition of potato tubers treated with "Rindite" in the first stages of germination.**] *Z. PflErnähr. Düng.* 1952, **59,** No. 3, 248-66, bibl. 30, illus. [Braunschweig- Völkenrode]

dite–a laboratory name given to a mixture of 7
; ethylenechlorhydrin, 3 vols ethylene dichloride
1 vol carbon tetrachloride—which hastens the
outing of newly-harvested potatoes, was applied
gaseous form at different concentrations to
ato tubers. Degeneration of growth-inhibiting
stances, particularly in the potato skin, set in
days after treatment ; at the same time the
r content of the tuber increased at the expense
arch, and the vitamin C (including glutathion),
no-acids, melanin contents and pH increased.—

4 EASTWOOD, T. and COBB, J. S. **The effect of herbicides upon potatoes used for chipping.** *Proc. 7th N. E. Weed Contr. Conf. 1953* 241-6, bibl. 3. [Penn. Agric. Exp. Sta., State College]

atoes were treated with the following herbicides:
N_2, CMU, Na 2,4-dichlorophenoxyethyl sul-
e, dichloral urea, Sinox General (water-soluble
ro), Na TCA and Premerge (DNOSBP amine
). All the herbicides except $CaCN_2$ were applied
. 50 gal. water per ac. The potatoes were
ted in early June, treated in mid-June and harvested in mid-September to mid-October. The herbicides were applied as delayed pre-emergence treatments. The use of all herbicides reduced the specific gravity of the tubers. Only one material consistently caused off-colour in tubers ; this was CMU at 1 lb. per ac., though CMU at 2 lb. per ac. did not cause a significant colour change. All materials, except Sinox General, caused definite off-flavours. In general, there was no obvious effect on the storage quality of the tubers following treatment.—P.J.B.

1417 WENZL, H. Bekämpfung der Colletotrichum-Welkekrankheit der Kartoffel durch Strohbedeckung des Bodens. [**Control of Colletotrichum wilt disease of potatoes by straw mulching.**] *PflSch. Ber.* 1953, **10,** No. 3/4, bibl. 10, 34-9, English summary p. 38.

Trials carried out at Fuchsenbigl, Lower Austria, in 1951-2 showed that a straw mulch of approx. 70 kg. per 100 sq. m. applied immediately after the mounding of the potato crop caused a reduction in the incidence of Colletotrichum, a crop increase of 12-15% and a decrease in the number of small tubers measuring 2-3 cm. The favourable effect of mulching was connected with better tilth and with the conservation of soil water.—M.A.

1418 ROBINSON, D. B. and AYERS, G. W. **The control of Verticillium wilt of potatoes by seed treatment.** *Canad. J. agric. Sci.* 1953, **33,** No. 2, 147-52, bibl. 6. [Pl. Path. Lab., Charlottetown, P.E.I., Canada]

The results of trials in which Semesan Bel was used as an instant-dip treatment for both cut and whole potato setts, showed that a good measure of control of *Verticillium albo-atrum* could be secured. Cut and treated setts harvested from a wilt-infected crop developed 12.5% wilted plants, compared with 58.9% wilted plants for similar, but untreated cut setts. Further trials were carried out to determine how much Semesan Bel treatment could cut down the progressive increase in the incidence of wilt in stock tubers. Plots planted with untreated, infected seed in 1947 had 20% wilted plants ; in 1948 and 1949, the percentage of infected plants rose to 51.5 and 80, respectively. In 1948, untreated seed producing 51.5% infected plants produced only 7.4% infected plants following treatment. In 1949, seed producing 80% infected plants produced 40.2% infected plants after treatment.—P.J.B.

1419 ENGLAND AND WALES. Ministry of Agriculture and Fisheries. Adv. Leafl. 139. **Potato virus diseases.** 1953, pp. 8, illus.

Descriptions are given of the symptoms caused by leaf roll and rugose mosaic. Control methods are described.—M.A.

1420 STEVENSON, F. J. and AKELEY, R. V. **Control of potato diseases by disease resistance.** *Phytopathology* 1953, **43,** No. 5, 245-53, bibl. 48.

A report is given of current progress in the USA in developing potato varieties resistant to the common virus and fungous diseases.—P.J.B.

1421 EMILSSON, B. Potatisens värde som utsäde. [**Potatoes for seed.**] *Lantm. Svenskt Land* 1953, **37,** No. 6, 126 and 129.

The results are given of studies in Sweden on the spread of virus Y in Bintje potatoes grown for seed. The results showed that crops should be rogued for virus-affected plants as soon as the symptoms are visible. In further studies on the effect of distance between plants on the spread of virus, it was apparent that infection within the crop was the decisive factor in virus spread. The risk of virus transmission from infected to uninfected plants fell off rapidly as the space between the respective plants increased from nil to four plants. With a spacing of over 4 to 5 plants between infected and uninfected plants, the risk of virus transmission was relatively constant. In studies of storage conditions for seed potatoes, it was concluded that a storage temperature of 4 - 5°C. was best. Sprout removal up to two times did not appreciably affect subsequent potato yields, except in the case of certain varieties, such as President and Katahdin.—P.J.B.

1422 MUENSTER, J. Lutte préventive contre les viroses de la pomme de terre. Essais comparatifs de destruction des fanes dans les cultures de plants. [**Control of potato viruses. Effects of haulm destruction.**] *Rev. rom. Agric.* 1953, **9,** No. 6, 45-7. [Beau-Cèdre (Jouxtens-Mézery)]

Trials were carried out in 1951 on Bintje and Erdgold potato varieties to determine the effect of the following virus control measures on crop yields: 1. Hand pulling of haulms. 2. Chemical treatment of haulms after foliage mutilation. 3. Chemical treatment after cutting of haulms. The following chemicals were used : Tufan or M 116 (DNC), 3%, 1600 1./ha. ; P. 52 (phenol and homologues), 5%, 2000 1./ha.; P 51 (DNC), 1%, 2000 1./ha.; A Amorta (sodium arsenite), 2%, 1000 1./ha. Results confirmed that hand pulling of the haulms was the most effective virus control method. The effectiveness of the use of chemicals depended on the time of application and on the previous crop treatment. When haulms of Bintje were mutilated before application, the tuber yield was less than when haulms were cut, while yields of Erdgold after haulm-cutting were, conversely, higher.—M.A.

1423 HEY, A. Verbreitung und Bekämpfung virusübertragender Blattläuse in Beziehung zum Auftreten von Kartoffelvirosen i Nachbau. [**Distribution and control of vir aphids in relation to the appearance potato viruses in the following crop.**] *Nachr dtsch. PflSchDienst, Berl.* 1952, **10,** 181- bibl. 34.

The reduction of the aphid population in any o year was not accompanied by a correspondi decline in virus infection. Even a small aphi population was capable of causing a high rate infection.—M.A.

1424 SALZMANN, R. and others. Kann die Au breitung der Viruskrankheiten der Kartoff auf dem Feld durch Bekämpfung der Blat läuse verhindert werden ? [**Can the spread potato virus diseases in the field be checke by aphid control ?**] *Mitt. Schweiz. Land* 1953, **1,** No. 7, 97-103, illus.

In 1950-2, experiments were laid down to stud the effect of insecticides on the aphid populatio infecting potato plants and the extent of r appearance of virus symptoms in the succeedin generation. Although concentrations of 0.1 t 0.2% Etilon (Parathion emulsion) and, to a lesse extent, concentrations of 0.1% Pestox 3 reduce the aphid population considerably, no significa reduction of virus symptoms in the succeeding cro resulted.—M.A.

1425 TANAKA, I. and others. **Witches' broom potatoes in Hokkaido and its host rang** [Japanese] *Res. Bull. 64. Hokkaido na agric. Exp. Sta.* 1953, 100-12, bibl. 24, illus English summary pp. 111-12.

The symptoms of this virus disease of potatoe as observed in potato plants in Hokkaido, an grafting experiments with 15 *Solanum* species a described.—From authors' summary.

1426 ROENNEBECK, W. Standorteinflüsse ein Abbaulage auf die Kartoffel bei Unte bindung von Virusverseuchung. [**A study the influence of depauperated areas o potatoes protected from virus infection** *Z. PflKrankh.* 1953, **60,** No. 5. 225-46, bib 11, illus., English summary pp. 245-6. [Bon

In 1951 and 1952, trials were made at three centr in the Rhineland to compare yields from proge of Ackersegen and Aquila seed, originally plant near Bonn in 1948, which had been kept free fro virus infection, and high-grade seed of the sam varieties obtained from seed merchants. The centr chosen for the experiment were climaticall different and were classed as depauperated area The results from the trials showed that seed fro the original stock after 4 plantings gave high yields than commercial high-grade seed. The theo of an ecological degeneration of potato seed grow in depauperated areas was not proved.—M.A.

27 DOBRENOV, M. [**Reproduction of potatoes by means of stecklings.**] [Serbo-Croat] *J. sci. agric. Res., Belgrade* 1951, **4,** No. 6, 153-7, bibl. 5, illus., German summary p. 157. [Received 1953]

28 BARKER, J. and EL SAIFI, A. F. **Studies in the respiratory and carbohydrate metabolism of plant tissues. 1. Experimental studies of the formation of carbon dioxide, lactic acid and other products in potato tubers under anaerobic conditions. 2. Interrelationship between the rates of production of carbon dioxide, of lactic acid and of alcohol in potato tubers under anaerobic conditions. 3. Experimental studies of the formation of carbon dioxide and of the changes in lactic acid and other products in potato tubers in air following anaerobic conditions. 4. The relation between the rate of carbon dioxide production in potato tubers in air following anaerobic conditions and the accompanying changes in lactic acid content and sugar concentration.** *Proc. roy. Soc. Sect. B.* 1952, **140,** 362-403, 508-55, bibl. 110, illus. [Low Temp. Res. Sta., Univ. Camb.]

9 LONA, F. and PORZIO GIOVANOLA, Elisa. Ricerche sulla fisiologia dell'acido ascorbico. 7. Contenuto in acido ascorbico delle piante in relazione al fattore termoperiodico. [**Investigations into the physiology of ascorbic acid. 7. The ascorbic acid content of plants in relation to the thermoperiodic factor.**] *Nuovo G. bot. ital.*, 1951, **58,** No. 3-4, 462-74, bibl. 10, English summary p. 474. [Publ. 1952] [Ist. Bot., Univ. Parma, Italy]

ials were carried out to study the influence of erent night temperatures on the ascorbic acid tent of leaves of young plants, among which the potato variety Majestic. The night temperaes tested varied from 12° to 28° C., whereas the temperatures were the same for all the plants er trial. Preliminary results indicated that the orbic acid content decreases as the night temature increases.—E.B.O.

40 SMITH, F. G. **Ascorbic acid formation in potato tuber slices.** *Pl. Physiol.* 1952, **27,** No. 4, 736-44, bibl. 28. [Iowa State Coll.]

41 HACKETT, D. P. and THIMANN, K. V. **The nature of the auxin-induced water uptake by potato tissue.** *Amer. J. Bot.* 1952, **39,** No. 8, 553-9, illus.

ter uptake by potato tissue, both in the presence absence of externally added auxin, is linked he general aerobic metabolism and corresponds ely to elongation in sections of etiolated seeds.—From authors' summary.

1432 YAMAMOTO, K. and NODA, K. **A study of tuberization in the potato plant. Morphological and anatomical observations on the general process of tuberization.** *Rep. Inst. agric. Res. Tohoku Univ.* 1950, **1-2,** 47-77, bibl. 20, illus. [Received 1953]

The object of this study was to present the results of morphological and anatomical observations on the process of tuberization, based on data obtained in the field and in the laboratory during 1946-8. The variety of potato used was Irish Cobbler. The process of tuberization took place in four stages ; elongation of the stolon, tuber formation, tuber enlargement and tuber completion.—M A

1433 TODD, G. W. **Enzyme studies on dormant and active potato tubers.** *Physiol. Plant.* 1953, **6,** No. 2, 169-86, bibl. 19, illus. [Bot. Dep., Univ. Missouri]

Studies are reported on the catalase, peroxidase, tyrosinase and adenosine-triphosphatase activity in different protein fractions of potato tubers, one half of each of which was stored continuously at a temperature of 2°C., with the corresponding halves stored at 2°C. and transferred to 25°C. for 10 days at monthly intervals, and of tubers stored continuously at a temperature of 25°C. Tyrosinase was the only enzyme which appeared to be directly connected with the dormancy period of the tubers at both storage temperatures. The tyrosinase activity of tubers immediately after harvesting fell markedly, the largest decrease occurring in tubers held at 25°C. Tyrosinase activity fell to a minimum before sprouting. It was thought that in the dormant state, most of the cellular oxidation occurs through the tyrosinase enzyme system and that under these conditions, the tuber is unable to produce enough excess energy from its oxidative processes to initiate sprouting. When tyrosinase activity diminishes, cellular oxidation occurs through the cytochrome-oxidase system, which provides enough energy to induce tuber sprouting. —P.J.B.

1434 TERMAN, G. L. **Relation of soil and fertilizer potassium to dry matter content and yield of potatoes.** *Soil Sci.* 1953, **75,** No. 6, 449-58, bibl. 9, illus. [Maine Agric. Exp. Sta.]

The relationship between the K and dry-matter contents of potato tubers and the influence of the content of exchangeable K in the soil on this relationship and on total yields of dry matter were determined over the period 1946-51 on plots varying in their content of exchangeable K per ac. in the ploughed layer. In all samples of tubers, except those grown in soils very low in exchangeable K, the dry-matter content decreased significantly as the content of K in the tubers increased. The dry-matter contents were not constant, among various samples, for given contents of K. The dry-matter content of tubers grown without K in the fertilizer increased up to levels of 200-350 lb. per ac. of exchangeable K in the soil and decreased at higher levels. On the same plots, the yields of dry matter per ac. increased up to levels of 350-500 lb. of exchangeable K per ac. The dry-matter content of tubers grown with 180 lb. K_2O, as muriate of potash, in the fertilizer, decreased in all years with increases in exchangeable K in the soil up to 500-700 lb. per ac. Higher amounts of K in the soil had little further effect on the dry-matter content. The yields of dry matter per ac. of tubers grown with fertilizers containing K, increased only slightly above a level of 200-400 lb. of exchangeable K in the soil. The bushel yields of potatoes on fertilized plots generally increased slightly up to levels of 500-650 lb. per ac. of exchangeable K in the soil.—W.J.B.

1435 HANSEN, F. Undersøgelser over opbevaring af kartofler. [**Storage investigations with potatoes.**] *Tidsskr. Planteavl* 1953, **56,** No. 2, 222-45, English summary p. 240.

The results are given of three series of trials in Denmark during 1939-51 on the storage of potatoes in boxes kept at different temperatures and in glass bottles containing air with different CO_2 contents, held at different temperatures. In all cases a rapid lowering of the storage temperature of the potatoes to 5°C., or lower, at the start of the storage period led to severe losses. An initial storage temperature of 15°C. for 14 days largely prevented these losses. Atmospheric CO_2 contents of over 1% appeared to increase storage losses.—P.J.B.

1436 GREAT BRITAIN. Department of Scientific and Industrial Research. **Report of the Food Investigation Board with the report of the Director of Food Investigation for the year 1952.** *Dep. sci. industr. Res.* London, 1953, 45-6, bibl. in text.

The introduction of *n*-amyl alcohol into the storage atmosphere at a concentration of 1 mg./l. completely inhibited the sprouting of potatoes at 10°C. (50°F.). Lower concentrations had an appreciable suppressant effect upon sprout growth. Sprouting could also be prevented, or reduced, by the vapours of several other alcohols.—M.A.

1437 PATERSON, D. R. **Some effects of foliar sprays of maleic hydrazide on the post-harvest physiology of potatoes, onions, and certain root crops.** *Dissert. Abstr.* 1953, **13,** No. 2, 147-8. [Michigan State College]

Single spray treatments of potato foliage with 1000 and 2500 ppm. concentrations of maleic hydrazide at 1-7 weeks before harvest were effective in prolonging the dormancy of Irish Cobbler, Pontiac, Russet Rural and Sebago potato tubers held in storage for 7 months at temperatures of 45 and 55°F. Complete sprout inhibition followed th application of the 2500 ppm. concentrations c maleic hydrazide, which was more effective in thi respect than pre-harvest foliage treatments wit 2,4,5-T, or post-harvest treatments with th methyl ester of alpha-naphthaleneacetic aci Early post-emergence spraying with 2500 ppn concentrations of maleic hydrazide did not preven subsequent tuber sprouting in storage. Low con centrations of maleic hydrazide applied shortl before harvest stimulated sprout growth durin storage.—P.J.B.

1438 BLACKITH, R. E. and others. **Fumigation o agricultural products. 3. The effects of hig doses of methyl bromide vapour on see potatoes and on their progeny.** *J. Sci. F Agric.* 1952, **3,** No. 10, 487-91, bibl. 3, illus

[See also *Hort. Abstr.* 21 : 758.] The dosage-respons relationship of methyl bromide vapour on see potatoes of the varieties Sharpe's Express, Glad stone and Majestic was studied. The variety Glad stone was the most severely affected, followed b Sharpe's Express and Majestic in that order. I previous treatments, Sharpe's Express showed th greatest susceptibility, but the data suggest tha continued treatments with methyl bromide resulte in the appearance of more resistant strains and i was considered that this effect was due to th heterogeneity of the Sharpe's Express tubers used The results of the study suggested that in mor fertile soil the harmful effects of methyl bromid fumigation were less pronounced.—M.A.

1439 BLACKITH, R. E. and LUBATTI, O. F **Fumigation of agricultural products. 4 Susceptibility of dressed seed potatoes t injury by methyl bromide vapour.** *J. Sci Fd Agric.* 1952, **3,** No. 10, 491-3, bibl. 3.

1440 MACLACHAN, D. S. and others. **Fumigatio of used bags with toxic gases for the contro of bacterial ring rot of potato.** *Canad. J agric. Sci.* 1953, **33,** No. 2, 132-40, bibl. 15 [Pl. Prot. Div., Sci. Serv., Dep. Agric. Ottawa, Ont.]

In trials to control *Corynebacterium sepedonicum* i potato sacks, carboxide (10% ethylene oxide + 90% CO_2) was effective as a fumigant for 500-ba bales when used at a rate of 80 mgm. per l., or 5 lb per 1000 sq. ft. with an exposure period of 24 h at atmospheric pressure ; under reduced at mospheric pressure, complete control was obtaine following exposure for 5 hr.—P.J.B.

SWEET POTATO

1441 FEAZELL, G. D. **Reaction of sweet potat varieties and seedlings to internal cor**

disease. *Phytopathology* 1953, **43,** No. 5, 290. [Abstract]

Studies on internal cork incidence in inoculated sweet potato tubers, stored at 70-80°F. for 7 months, showed that Porto Rico Unit 1, Queen Mary and Goldrush were susceptible to the disease, Heartgold was intermediate in resistance, while Allgold and Pelican Processor were resistant. Notes are also given on the resistance ratings of a number of seedlings, 4 of which were resistant to the disease.—P.J.B.

442 MIKELL, J. J. **The influence of chemical treatments on the growth and flowering of sweet potatoes.** *Proc. Amer. Soc. hort. Sci.* 1952, **60,** 295-8, bibl. 5. [Louisiana Agric. Exp. Sta., Baton Rouge]

Water solutions containing 1, 10, 25 and 50 ppm. f 2, 3, 5-tri-iodobenzoic acid, ammonium salts of ,4-D and alpha-naphthaleneacetic acid applied nternally to the stems of sweet potato plants, had o effect on floral primordia initiation in the plants. nly under conditions where the starch content of he plants was low did 2, 3, 5-tri-iodobenzoic acid ause abnormal growth; this compound had no ffect on the plants when applied to the soil, or s a foliage spray.—P.J.B.

THER STARCH PLANTS

443 MILLAUD, R. Insectes parasites des plantes utiles des établissements français de l'Océanie. [**Insect pests of useful plants in French Oceania.**] *Agron. trop., Nogent* 1952, **7,** No. 6, 589-99, bibl. 11.

his article includes information on the control of *arophagus proserpina* and an aphis (presumably *phis gossypii*) on taro, *Colocasia antiquorum.*—.B.O.

44 DADANT, R. Premiers résultats dans la lutte contre la maladie des taros dits des Nouvelles-Hébrides. [**First results in controlling a disease of taros from the New Hebrides.**] *Rev. agric. Nouv. Calédonie* 1952, **3,** No. 11-12, 4-5.

o control a disease of taros (*Colocasia* sp.) in New aledonia, caused by *Pythium*, it is recommended at taros be grown in a soil which has not carried his crop for several years and that clean and ealthy tubers be planted after they have been isinfected by soaking for 30 min. in an aqueous lution of Solusanigran at 2 per 1000.—E.B.O.

ALE

45 ANDERSSON, G. and THORWALL, S. Redogörelse för fröodlingsförsök med fodermärgkål vid Sveriges Utsädesförening 1945-1948. [**Report of seed production trials with marrow-stem kale carried out by the Swedish Seed Association, 1945-48.**] *K. LantbrAkad. Tidskr.* 1952, **91,** No. 4, 246-59, bibl. 4, English summary pp. 258-9.

The trials reported were carried out at 2 locations in south Sweden. The results showed that even in the most favourable locations, seed production of marrow-stem kale in the field was a hazardous affair, mainly owing to winter-killing and the inroads of pests. The crop appeared to withstand temperatures of —13 to —17°C. for a short time, but was still far less winter-hardy than winter rape. Marrow-stem kale appeared to reach its stage of maximum winterhardiness considerably later than winter rape and the best time of sowing was June in south Sweden. The optimum plant spacing appeared to be 10 in. in the row, in rows 24 in. apart. In varietal trials, marrow-stem kale from the Swedish Seed Association, Siberian kale, green marrow-stem kale, thousand-headed kale, Hungry-gap kale, Svalöf's Sen rape and Rapido winter turnip-rape were compared. The first-mentioned variety appeared to be best under the trial conditions, though the variety was lacking in uniformity. Notes are given on methods of overwintering kale plants in clamps. The best method was storing the untopped plants whole in 2 parallel rows under a covering of earth and straw, with the roots inwards and adjacent to one another in the rows.—P.J.B.

GENERAL

1446 NORTH, C. **Three methods for vegetative propagation of *Brassica oleracea*.** *J. roy. hort. Soc.* 1953, **78,** Pt 3, 106-11, bibl. 7, illus. [Cambridge]

The advantage of raising and maintaining high quality seed strains of *Brassica oleracea* by means of vegetative propagation is stressed. Three methods are described which have been found to give satisfactory results, namely: propagation from leaf-bud cuttings from plants which have been maintained in a vegetative condition, from root cuttings and from curd portions.—M.A.

FIBRE CROPS

COTTON

1447 COTON ET FIBRES TROPICALES. Aperçu sur la culture du coton en Roumanie. [**An outline on cotton-growing in Romania.**] *Cot. et Fibr. trop.* 1952, **7,** No. 2, 250-2, illus.

1448 JAMESON, D. Le coton en Uganda. [**Cotton**

in Uganda.] *Cot. et Fibr. trop.* 1952, **7,** No. 2, 149-59, bibl. 14, illus. [Dep. Agric., Uganda]

1449 Delattre, R. and Corcelle, P. Mission d'études cotonnières aux U.S.A. Compte rendu de la Mission d'études cotonnières effectuée du 14 Août au 12 Novembre 1951 aux U.S.A. [**A Mission to study cotton in the USA. Report of a Mission to study cotton carried out from 14 August to 12 November, 1951, in the USA.**] *Cot. et Fibr. trop.* 1952, **7,** No. 2, 160-249, illus. [Inst. Rech. Cot. Text. Exot., Paris]

1450 Ahmad, N. **Textile fibres [cotton and jute] of Pakistan.** *Brit. agric. Bull.* 1953, **5,** No. 23, 306-8, illus. [Rep. Paper read at Brit. Ass. Ann. Meet. 1952.]

1451 Dastur, R. H. and Gopani, D. D. **The effect of spacing on the growth and yield of cotton in South Gujerat (Surat).** *Indian J. agric. Sci.* **22,** No. 2, 113-37, bibl. 15, illus. [Govt Fm, Surat]

Cotton plants (*Gossypium herbaceum*) were grown at spacings of 4, 8, 12 and 16 sq. ft. per plant in experiments carried out in 1944-8 on black clayey soils to determine the effect of spacing and manurial treatment on the growth and yield of cotton. The effect of close spacing was to depress the reproductive growth (and hence the crop yield) but not the vegetative growth as measured by dry-weight yield per unit area. The optimum spacing was 12 sq. ft. per plant. Since differences in length/breadth ratios for a given spacing did not affect yield, 6 ft. between rows and 2 ft. between plants in the row is recommended as the most convenient spacing. On plots where groundnut cake or ammonium sulphate was applied at the rate of 50 or 100 lb. per acre, all plots benefited from the increased supply of N and in general the yields of the more widely-spaced plants were significantly higher than those closely spaced. The root growth of the closely-spaced plants was less vigorous than that of the widely-spaced plants, even where N had been applied. The vegetative growth of the plants was benefited to a greater extent than the reproductive growth by the application of N.—W.J.B.

1452 Joshi, V. K. **Relationship between rainfall and yield of Gaorani 6 cotton.** *Indian Cott. Gr. Rev.* 1953, **7,** No. 2, 118-28, bibl. 2, illus. [Cott. Res. Sta., Nanded]

The effect of rainfall on the yield of rain-fed cotton grown on black soil in the Godavari Valley was determined, over the period 1941-51, in a replicated experiment in which each plot carried Gaorani 6 cotton (*Gossypium arboreum*) and millet [*Sorghum vulgare*] in alternate years. The sowing dates for cotton ranged from 14 June to 6 July. Rainfall, measured from June to December each year, varied between 21.5 and 44.9 in. over the 10-year period. There was a significant negative correlation, over the range of rainfall recorded, between the amount of rainfall received and the yields of seed cotton and lint. The yield of seed cotton was highest (783 lb. per ac.) in the season 1941-2, when rainfall was the lowest recorded, and lowest in 1949-50 (156 lb. per ac.) when rainfall was the highest recorded. The percentage of unproductive plants (plants yielding no ripe bolls) increased with increasing rainfall, while the plant population per acre declined progressively with increasing rainfall. Since on the average only 2.3 in. of rainfall are received in the period October-December, it will be possible to predict the yield of rain-fed cotton with some accuracy in September of each year on the basis of its correlation with the June-December rainfall.—W.J.B.

1453 Tanganyika Department of Agriculture. **Ukiriguru Experimental Station and Lubaga Sub-Station.** *Rep. Dep. Agric Tanganyika 1951* Dar es Salaam, 1953, 33-4.

In a time-of-weeding trial on cotton, plots on land in good heart which were weeded early, and then kept clean, yielded over 900 lb. seed cotton per acre while plots weeded early and then left unweeded yielded around 100 lb. per acre only. In confirmation of earlier work, it was demonstrated that 10% DDT plus 3% BHC with talc filler, when applied with hand dust-guns, was effective in controlling American bollworm and stainer.—M.A.

1454 Ash, A. G. and Karr, E. H. **A magnesium chlorate product as a new cotton defoliant.** *Agric. Chem.* 1953, **8,** No. 7, 42-3 and 107-11, illus. [Pennsylvania Salt Mnfg Co., Tacoma, Wash.]

Notes are given on current developments in cotton defoliation in the USA, based mainly on the application from the air of Penco Defolate (58% magnesium chlorate hexahydrate) sprays. A number of practical recommendations are made for the use of this material.—P.J.B.

1455 Sivaraman, M. S. **The Madras cottons.** *Indian Cott. Gr. Rev.* 1953, **7,** No. 2, 149-59, illus.

An account, accompanied by maps, is given of the distribution and yields of the 5 main types of cotton grown in Madras (Cambodia, Tinnevellies, Westerns, Northerns and Cocanadas). The improved varieties in use and the methods of cultivation employed in different parts of Madras are also described.—W.J.B.

1456 Jagannatha Rao, C. and others. **A brief review of the cotton breeding problems in**

the Madras State with special reference to improvements in yield and quality. *Indian Cott. Gr. Rev.* 1953, **7,** No. 1, 48-56, bibl. 3. [Cott. Breed. Sta., Coimbatore]

The extent and output of the cotton-growing ndustry in Madras State is described and details concerning the part played in the industry by each of the main commercial types of cotton are tabulated under the heads : region of growth, soil type, rainfall and acreage in 1949-50. An account is given of the cotton-breeding programmes.—W.J.B.

457 CAMPBELL, J. D. **One-variety cotton in Oklahoma.** *Bull. B-386. Okla. agric. Exp. Sta.* 1952, pp. 19.

A review is given of the present position, and the dvantages and disadvantages, of single variety cotton communities. The principal advantage of growing a single variety of cotton is in the production of pure seed, though the need for such eed is low, being under 10% of the total bulk of otton seed produced. Grade and staple of cotton produced at one-variety gins varied almost as much as that produced at gins dealing with 2, or more, varieties. It is considered that sorting by otton classers and blending can produce the ualities desired by mills better than the use of the ne-variety system.—P.J.B.

458 MELO DO NASCIMENTO, F. Cultura do algodoeiro Mocó. [**The cultivation of Mocó (perennial) cotton.**] *Publ. 785. Minist. Agric. Serv. Inform. Agríc., Rio de Janeiro* 1952, pp. 35, bibl. 5, illus.

. description is given of Mocó perennial cotton *Gossypium purpurascens*) which is grown in the emi-arid regions of north-eastern Brazil where he annual rainfall varies from 7.5 to 10 in. Methods f preparing the seed-bed and of sowing seed or lanting rooted cuttings are recommended. A uitable spacing for Mocó plants is 2.5 × 2.5 m. he productive life of the plant, properly pruned, 5 years.—W.J.B.

459 LAMBOU, M. G. **2,3,5-triphenyltetrazolium chloride as a rapid indicator of viability in cottonseed.** *Science* 1953, **117,** No. 3051, 690-3, bibl. 21. [South. Reg. Res. Lab., New Orleans, La.]

. report is given of rapid procedure, using a nodification of the technique of Porter and others ee *Fld Crop Abstr.* 1 : 431]. The results showed hat the use of the modified method described gave romise as a rapid means of estimating changes in he viability of cotton seed.—P.J.B.

460 BARTON, Lela V. **Seed storage and viability.** *Contr. Boyce Thompson Inst.* 1953, **17,** No. 2, 87-103, bibl. 22.

he results are given of studies on the effect of prolonged storage under different conditions on the viability of the seed of cotton and a number of horticultural species. Storage of cotton seed with 5% moisture content in sealed containers at −4°C. resulted in good germination after a 10-year period, as did storage of similar seed at 5°C. for 5 years. The necessity of maintaining an unbroken seal on containers when storing seed under these conditions is emphasized. The effects of storage on seed and their practical significance is discussed. —P.J.B.

1461 SULOCHANA, C. B. **Soil conditions and root diseases. 7. Response of cotton plants to micro-element amendments and its relation to disease development.** *Proc. Indian Acad. Sci. Sect. B* **36,** No. 6, 234-42, bibl. 5. [Univ. Bot. Lab., Madras]

Seeds of a variety of cotton susceptible to cotton wilt fungus (*Fusarium vasinfectum*) were sown in pots containing field soil inoculated with the fungus and amended with Al, B, Co, Li, Mn, Mo and Zn, applied singly at rates of 50, 100, 200 and 400 ppm. Zinc gave the best control of the disease at 50 ppm. and complete control at 100 ppm. and in addition benefited the growth of the plants.—W.J.B.

1462 MILLER, J. H. **Report of preliminary study of tri-basic copper in control of Ascochyta blight of cotton.** *Phytopathology* 1953, **43,** No. 5, 292. [Abstract]

For controlling seedling blight caused by *Ascochyta gossypii*, thrips, *Rhizoctonia solani*, or a combination of these, the following dust materials, applied at 4-week intervals at a rate of 20 lb. per ac., resulted in significantly higher cotton stands than untreated controls, or those treated with sulphur : 7% copper + 5% DDT, 7% copper + 2% zinc, 5% copper + 2% zinc + 5% DDT, and 6% copper. The first-mentioned material was the most effective. All contained copper in the form of tri-basic copper.—P.J.B.

1463 PARENCIA, C. R. and EWING, K. P. **Late-season control of boll weevil and bollworm with sprays and dusts in 1950.** *J. econ. Ent.* 1953, **46,** No. 1, 108-12, bibl. 1. [Texas Agric. Exp. Sta.]

This article is concerned with the control of *Anthonomus grandis* and *Heliothis armigera* on cotton.—E.B.O.

1464 CALHOUN, S. L. and DUNNAM, E. W. **Heptachlor and other insecticides for control of cotton pests.** *J. econ. Ent.* 1953, **46,** No. 1, 157-8. [Mississippi Agric. Exp. Sta.]

It is concluded that Heptachlor at 0.25 lb. per acre, in either dust or spray, is sufficient for controlling the boll weevil, *Anthonomus grandis*, under the conditions of Stoneville, Miss.—From authors' summary.

1465 MISTRIC, W. J. and GAINES, J. C. **The toxicity of certain insecticides to the over-wintered boll weevil** [*Anthonomus grandis*]. *J. econ. Ent.* 1953, **46,** No. 2, 350-2, bibl. 3. [Texas Agric. Exp. Sta.]

1466 MISTRIC, W. J. and GAINES, J. C. **Effect of wind and other factors on the toxicity of certain insecticides.** *J. econ. Ent.* 1953, **46,** No. 2, 341-9, bibl. 4. [Texas Agric. Exp. Sta., College Station]

The toxicity of various insecticides was tested on the boll weevil, *Anthonomus grandis*, the cotton leafworm, *Alabama argillacea*, and the salt-marsh caterpillar, *Estigmene acraea*.—E.B.O.

1467 RASKI, D. J. and others. **Nematode on cotton. Root-knot nematode control by soil fumigation profitable in Kern County** [**California**]. *Calif. Agric.* 1953, **7,** No. 4, pp. 8 and 13. [Univ. California, Berkeley]

Comparisons were made of the effectiveness of row applications before sowing and at the time of sowing, of 3.9, 6.9, 9.5 and 12 gal. per ac. DD mixture and standard pre-sowing flat treatments of 20 gal. DD mixture per ac. for controlling root knot nematode (*Meloidogyne incognita* var. *acrita*) on cotton. The standard flat treatment gave considerably higher lint yields than did any other treatment, giving 96.6% control of nematodes, compared with 83% control for the next best treatment, which was pre-sowing treatment with 12 gal. DD mixture per ac., applied with 2 chisels, one on each side of the seed-row. Treatment at the time of sowing could not be recommended owing to possible phytotoxic effects on the plants.—P.J.B.

1468 GRAHAM, T. W. and HOLDEMAN, Q. L. **The sting nematode, *Belonolaimus gracilis* on cotton and other crops in South Carolina.** *Phytopathology* 1953, **43,** No. 5, 291. [Abstract]

Applications of 4 gal. ethylene dibromide, or 20 gal. DD mixture per ac. were effective in controlling sting nematode damage to cotton in the field. —P.J.B.

1469 CADOU, J. and KAMMACHER, P. Essai d'interprétation des résultats d'un essai comparatif de variétés de coton par l'influence combinée de deux parasites : *Lygus vosseleri* Popp. (Heter. Caps.) et *Empoasca* sp. (Hom. Jass.). [**An attempt to explain the results from a comparative trial on cotton varieties by the combined influence of two pests : *Lygus vosseleri Popp.* (Heter. Caps.) and *Empoasca* sp. (Hom. Jass.).**] *Cot. et Fibr. trop.* 1952, **7,** No. 2, 273-85, bibl. 5, illus. [Sta. Rech. IRCT, Bambari, Ubangi-Shari]

From 2 comparative plot trials with 8 varieties of cotton (*Gossypium hirsutum*) sown at 2 different dates, different results were obtained which were attributed to the fact that the pests *Lygus vosseleri* and *Empoasca* sp. attacked the cotton sown at the end of July and not that sown at the end of June. The varieties tested showed a different susceptibility to these pests.—E.B.O.

1470 LAL, K. B. and CHHOTEY SINGH. **The cotton leaf roller, *Sylepta derogata* Fabr. 1. Relative incidence on *Hirsutum* cottons. 2. Control.** *Indian Cott. Gr. Rev.* 1953, **7,** No. 1, 77-91, bibl. 19.

The leaf roller, *S. derogata*, is a serious, although sporadic, pest of American cottons (*Gossypium hirsutum*) in Uttar Pradesh. A study was made of the effects of the variety of American cotton used, and of the rate of application of N to the soil, on the incidence of *S. derogata*. No variety tested was immune to the leaf roller, nor was there any marked correlation between variety and the degree of incidence of the pest. The variety 100F appeared to be the least susceptible, and the variety Perso-American the most susceptible, to attack. Nitrogenous manuring caused an increase in the incidence of the pest. Regular hand-picking of rolled leaves in the early stages of the attack and spraying with 0.5% DDT and 0.5% BHC were found to be effective means of controlling the pest.—W.J.B.

1471 CALHOUN, S. L. and DUNNAM, E. W. **Endrin for control of cotton pests.** *J. econ. Ent.* 1953, **46,** No. 1, 170-3. [Mississippi Agric. Exp. Sta.]

1472 SCALES, A. L. and others. **EPN for cotton insect control.** *J. econ. Ent.* 1953, **46,** No. 1, 130-3, bibl. 5. [Texas Agric. Exp. Sta.]

1473 YOUNG, M. T. and GAINES, R. C. **Tests of insecticides for control of cotton insects.** *J. econ. Ent.* 1953, **46,** No. 1, 133-6. [U.S. Dep. Agric., Bur. Ent. and Pl. Quarant.]

1474 TARR, S. A. J. **Seed treatment against blackarm disease of cotton in the Anglo Egyptian Sudan. 3. The toxicity of mercuric chloride-iodide steeping treatments to cotton seed.** *Emp. Cott. Gr. Rev.* 1953, **30,** No. 3, 182-91, bibl. 3.

The toxicity of mercuric chloride-iodide solutions to Sakel cotton seed was investigated. In general, soaking for more than a few hours in 0.2% mercurial solution (at the rate of 600 c.c. per. lb. of seed) tended to injure the seed. Germination and the development of seedlings and roots were progressively impaired as the duration of the steeping period increased. Similar trials with seed delinted by immersion in concentrated sulphuric cid showed that acid-delinted seed was consider- ly more susceptible to damage by steeping in 2% solutions than undelinted seed. The sus- eptibility of acid-delinted seed to subsequent ercurial treatment increased with increasing me of exposure of the seed to the acid. It is sug- ested that 0.1% solutions should be used when eating acid-delinted seed. Experiments with arious rates of application of the 0.2% steeping lution showed that a rate of 600 c.c. solution er lb. of seed had no adverse effect on the ger- ination and seedling development of undelinted ed, while a rate of 1000 c.c. per lb. had only slight dverse effects. Prolonged storage of undelinted ed, steeped in 0.2% mercuric chloride-iodide lution and dried, gave rise to no loss of ger- ination capacity attributable to the steeping eatment. The flotation method of estimating rmination capacity was found to be unreliable hen applied to seed injured by toxic doses of ercuric iodide-chloride.—W.J.B.

475 Dastur, R. H. and Kanwar Singh. **A study of the effect of trace elements on the growth and yield of American cottons.** *Indian Cott. Gr. Rev.* 1953, **7,** No. 1, 57-66, bibl. 6.

mall quantities of the salts of Mo, B, Cu, Mg, Fe, n, Zn and Cr were added each year, over the eriod 1947-50, to plots of alkaline black soil in the alwa tract in an experiment to determine the fect of doses of the individual elements on the owth and yield of American Upland cotton. he experiment was continued after 1950 to deter- ine the residual effect of the elements. Con- stently significant increases in yield over the con- ols were recorded on plots receiving applications Cr and Zn in the period 1947-50. Cr, Zn, Mn, B nd Cu gave significant increases in yield in the ason 1949-50, and the residual effect on yield of ese five trace elements was marked in the season 50-1. Applications of Zn resulted in early ripen- g of the crop in 3 years out of 4.—W.J.B.

76 Joham, H. E. **Accumulation and distribution of molybdenum in the cotton plant.** *Pl. Physiol.* 1953, **28,** No. 2, 275-80, bibl. 8, illus. [Texas Agric. Exp. Sta., Coll. Sta., Texas]

otton absorbs and accumulates molybdenum adily from nutrient solutions which contain dium molybdate. The amounts absorbed by tton compare favourably with those of legumes hich are considered to be accumulators of this ement. The leaves of cotton contained approx- ately five times as much molybdenum as the ems and roots. The fruiting bodies contained ghtly less molybdenum than the stems and roots. -From author's summary.

1477 Kikuchi, M. and Ikeuchi, Y. **Influence of ultra-short electromagnetic waves on the development of cotton plants.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1952, **21,** Nos. 1-2, 168-9, bibl. 5, illus., English summary p. 169.

Cotton seeds were subjected to ultra-short electromagnetic waves (wave-length 3 m.) for 10, 20, 30 and 40 min. In all cases the waves favourably influenced the growth of plants and the opening of flowers and bolls. Wave-emissions lasting 20 min. had the most beneficial effect on subsequent plant-growth.—W.J.B.

1478 O'Kelley, J. C. **The use of C^{14} in locating growth regions in the cell walls of elongating cotton fibers.** *Pl. Physiol.* 1953, **28,** No. 2, 281-6, bibl. 9, illus. [Biol. Dep., Univ. Alabama, Tuscaloosa, Ala]

A technique involving the use of C^{14} in the study of cell-wall formation in the cotton fibre is used to determine if the cotton fibre elongates only at the tip. After its introduction into the cotton plant in the form of carbon dioxide, C^{14} continues to be incorporated as cellulose in the walls of developing cotton fibres for a long period of time. After introduction of C^{14} into a cotton plant possessing partially elongated fibres, the entire cellulose framework of the primary wall becomes radioactive. It is concluded that cell elongation in the cotton fibre involves cellulose synthesis throughout the length of the fibre wall instead of at the tip of the fibre alone.—Author's summary.

FLAX

1479 Volesky, E. Agrotechnika vysokých sklizní lnu. [**Agrotechnical measures for obtaining high yields of flax (in Czechoslovakia).**] *Social. Zeměd.* (*Social. Agric.*) 1953, **3,** No. 3, 247-58.

1480 Rataj, K. K otázce raného výsevu lnu a jeho odolnosti proti mrazu. [**Early sowing of flax in relation to frost resistance of the crop.**] *Social. Zeměd.* (*Social. Agric.*) 1953, **2,** No. 2, 147-63, illus.

1481 Silversides, W. H. **New aspects of weed control in flax.** *Proc. Joint 9th N. Cent. and 6th W. Canad. Weed Contr. Conf. 1952* 5-6.

A brief review is given of work in western Canada on trials with MCPA, TCA, IPC, ClIPC, maleic hydrazide, and on combinations of TCA with 2,4-D and MCPA for weed control in flax. For control of foxtail (*Setaria* sp.) in flax, TCA at 5 lb. + 2,4-D amine, or MCPA, at 5 oz. per ac., applied when the flax was 3-5 in. high and the foxtail less than 2 in. high, gave good results and controlled other susceptible broad-leaved weeds. MCPA was ineffective against Russian thistle (*Salsola pestifer*). The use of TCA has resulted in reductions in stands of wild oats (*Avena fatua*) in flax.—P.J.B.

1482 FREDERIKSEN, S. Undersøgelser over en raekke spind- og oliehørsorters modstandsdygtighed mod hørrust (*Melampsora lini* (Pers.) Lev.). [**Investigations on the resistance of a number of fibre flax and linseed varieties to flax rust (*Melampsora lini* (Pers). Lev.).**] *Tidsskr. Planteavl* 1953, **56,** No. 2, 246-71, bibl. 42, illus., English summary pp. 268-9.

Trials in Denmark are reported on the resistance to flax rust of 31 varieties of fibre flax and 20 varieties of linseed. Among fibre flax varieties, Verum (Dutch), Textilshchick (Russian) and Cascade were immune ; Svalöf's 0.29b and 0.200, Formosa, Wiera (Dutch), Norfolk Mandarin and an American accession No. 195 were only slightly attacked. Among very susceptible varieties were Øtofte 47 and 16, Liral Sussex (Danish), Norfolk Earl and the Northern Irish varieties Liral Prince, Stormont Motley and Stormont Cirrus. The resistant varieties were predominantly late-maturing. The linseed varieties used were almost all resistant to *M. lini*, though Concurrent, used as a standard variety, was severely attacked. It is considered that in Denmark, flax rust does not constitute a risk for the linseed varieties usually grown. It was not possible to determine whether the extent of external rust injury to fibre-flax plants provided any index of fibre damage. It is stressed that the only method of controlling flax rust is by the use of resistant varieties. It is not known whether physiologic races of flax rust exist.—P.J.B.

1483 MOORE, A. M. **Growth inhibition studies. 1. Measurement of the effects of inhibitors on the growth rate of flax seedlings.** *J. exp. Bot.* 1953, **4,** No. 10, 23-39, bibl. 13. [Dep. Biochem., Univ. Toronto, Canada]

A method for measuring the rate of growth of small seedlings under special conditions suitable for inhibition and reversal studies is described, and its use is illustrated in studies of the inhibitory action of a variety of chemical substances. The limitations imposed, in such studies, by the osmotic pressure of the test solutions have been examined in the case of flax seedlings.—Author's summary.

1484 MOORE, A. M. **Growth inhibition studies. 2. Sulphanilamide inhibition and its reversal.** *J. exp. Bot.* 1953, **4,** No. 10, 32-9, bibl. 13. [Dep. Biochem., Univ. Toronto, Canada]

In a study of the inhibitory effect of sulphanilamide on the growth of flax seedlings and its reversal by *p*-aminobenzoic acid (PABA) and related compounds, two distinct types of reversal mechanism have been observed. The results, derived from growth-rate measurements, are interpreted as indicating that, in the flax seedling, sulphanilamide interferes with the conversion of PABA to pteroyl-glutamic acid. None of the purine or pyrimidine compounds tested showed any reversing action.—Author's summary.

JUTE

1485 SANYAL, A. T. **Possibilities of growing jute as a row crop.** *Jute Bull.* 1953, **15,** 1-12, illus. [Jute Agric. Res. Inst.]

Trials were made to determine whether sowing jute (*Corchorus capsularis* and *C. olitorius*) in rows could profitably replace the traditional practice of broadcasting the seed. A saving of 50% in the quantity of seed used was made when the seed was sown in rows by means of a hand-pushed seed-drill. Savings of 20-30% were made in the cost of production (chiefly as a result of reduced costs of weeding) and increases in yield of 12-30% in the case of *C. capsularis* and 11-16% in the case of *C. olitorius* were obtained when the crops were sown in rows. A description is given of the hand-pushed seed-drill together with detailed advice on its operation. Spacing should be 12 in. between rows and 1-4 in. between plants according to locality. [See also Abs. 263.]—W.J.B.

1486 BADRUDDOJA, K. M. and ISHAQUE, M. **Control of stem-rot of jute by seed treatments and fungicidal sprays.** *Proc. 4th Pakistan Sci. Congr. Peshawar 1952* Pt. 3, 43-4. [Cent. Agric. Exp. Sta. Tejgaon, Dacca]

Seed treatments and fungicidal sprays against stem-rot (*Macrophomina phaseoli*) of jute were tested on plots heavily infested with the fungus. Among the substances tested, Arasan gave the best control. Plants from seed treated with Arasan were free from infection up to the fourth week of growth. Among the fungicidal sprays applied to the plants, 0.25% Perenox gave better control than cuprous oxide or Bordeaux mixture. The average percentage of infection during the first six-week period of growth was 2.9 where plants were sprayed with Perenox and 7.6 where plants were untreated.—W.J.B.

URENA LOBATA

1487 LEFORT, M. Étude cytologique de deux variétés d'*Urena lobata*. [**A cytological study on two varieties of *Urena lobata*.**] *Cot. et Fibr. trop.* 1952, **7,** No. 2, 263-72, bibl. 6, illus. [Sta. Rech. IRCT, Madingou, Middle Congo]

The 2 *Urena lobata* varieties studied are *communis* and Nigeria UL O1. A comparison of these 2 varieties and 5 others (named) indicated that Nigeria UL 01 has a more rapid growth, flowers about 20-25 days earlier than the other varieties, and reaches at maturity a height of 2.20 m., as against an average of 1.30 m. in the other varieties.—E.B.O.

OIL CROPS

LINSEED

1488 DENMARK. Statens Forsøgsvirksomhed i Plantekultur. Medd. 466. Forsøg med gødskning af oliehør og opiatvalmue. [**Manurial trials with linseed and opium poppy.**] *Tidsskr. Planteavl* 1953, **56,** No. 2, 304-16.

Trials in Denmark during 1941-4 with different amounts of farmyard manure and artificials showed that both opium poppy and linseed required ample manurial treatment to give good yields, and that the amount of N applied was the most decisive factor in raising seed yields. In trials during 1948-51 at 3 locations on clay loam soils, nil, 200, 400, 600 and 800 kg. nitrochalk per ha. was applied to linseed. Mean seed yields were 14.1, 17.3, 9, 19.5 and 19.1 hkg. per ha., respectively. Mean 1000-grain weights fell from 8.4 for crops receiving no N, to 7.9 for crops receiving 800 kg. nitrochalk per ha.; under the same conditions, the crude protein content of the seed rose from 17.4 to 21.4%, the crude fat content fell from 40.9 to 37.5% and the iodine number of the oil fell from 196 to 184. Crops receiving 800 kg. nitrochalk per ha. were iable to lodge seriously. The rate of seed yield ncrease fell off sharply as the rate of nitrochalk pplication rose above 200 kg. per ha. In similar rails with opium poppy, applications of nil, 200, 00 and 600 kg. nitrochalk per ha. were made. Mean seed yields were 8.2, 10.4, 11.9, and 12.7 hkg. per ha., respectively. The crude protein and fat ontent of the seed declined slightly as the rate of N treatment increased.—P.J.B.

UNFLOWER

489 BRYSSINE, P. Le tournesol. [**Sunflower.**] *Terre maroc.* 1953, **27,** No. 279, 39-43, bibl. 19. [Cent. Rech. Agron., Rabat, Morocco]

nformation is given on sunflower cultivation which is on the increase in French Morocco (15,000 a. in 1951). This crop has been under trial for more than 30 years at the above centre. Of the arieties tested, the English variety Jupiter, of medium height and with one head only per plant, considered so far to be the best for combine harvesting. If harvesting is carried out by hand, it is preferable to grow the giant varieties which yield more.—E.B.O.

1490 SALNI, L. [**Determination of oil in sunflower seed according to the modified method of Gerber.**] [Serbo-Croat] *J. sci. agric. Res., Belgrade* 1951, **4,** No. 6, 164-9, bibl. 3, German summary p. 169. [Received 1953]

Gerber's method for the determination of fat in milk can be used for determining oil in seed of *Helianthus annuus* by use of the modification described.—M.H.

RAPE

1491 SELERUD, Å. Vårfrostens skadegörelse på hostoljeväxterna. [**Frost damage to winter oil-seed crops (in Sweden).**] *Svensk. Frotidn.* 1953, **22,** No. 4, 33-7, illus.

Sowing date and varietal trials with winter rape [*Brassica napus* var. *oleifera* subvar. *biennis*] and winter turnip-rape [*B. campestris* var. *oleifera* subvar. *biennis*] were carried out at Ultuna, during the winter of 1951-2. The weather during the winter was mild up to March when temperatures fell to −18°C., warm in mid-April and very cold during the nights of 8 and 9 May (−5.3°C.], when growth had started. In winter rape, damage following the May frost was mainly chlorosis of the leaves; in winter turnip-rape, both stalk damage and leaf chlorosis occurred. Sowing dates used were 14 and 28 August and 5 and 13 September. The first two sowing dates resulted in considerably higher seed yields than the last two. With winter rape, frost damage was slight in crops sown on the first date, while those sown on the last 3 dates were considerably delayed in maturity by the May frost and a number of plants were dwarfed. In the varietal trials, Lembke, Tenus, Regal and Matador winter rape were used. Seed yields were 2160, 2040, 2220 and 2220 kg. per ha., respectively. The winter turnip-rape varieties used were Lembke, Storrybs, Gruber and Rapido, which gave respective yields of 1880, 1960, 2060 and 2220 kg. per ha. The winter turnip-rape varieties were sown later than the winter rape varieties, which accounted for the mean-yield differences. Rapido turnip-rape was superior to the other turnip-rape varieties in surviving frost damage. There were few differences between the winter rape varieties in respect of frost resistance.—P.J.B.

MUSTARD

1492 GARNER, F. H. **Mustard.** *Agriculture, Lond.* 1953, **60,** No. 2, 84-7.

A brief account is given of the present position of mustard-growing in Britain and the management practices suitable for the crop, whether grown as green manure, or for seed. It is considered that the use of the new variety Trowse Black may extend the growing of mustard beyond the fen soils and other light soils of East Anglia. [For Trowse Black, see Abs. 842.]—P.J.B.

1493 Anderson, G. Svalöfs Flora vallmo. [**Svalof's Flora oil-seed poppy.**] *Sverig. Utsädesfören. Tidskr.* 1953, **63,** No. 1, 56-62, English summary pp. 61-2.
Notes are given on past developments in the growing of the oil-seed poppy in Sweden. Oil-seed poppy growing was discontinued in Sweden after 1946, but in view of the advantages of the crop under certain conditions, breeding work was continued from 1938 by the Swedish Seed Association, using the tall, high-yielding variety Mahndorf and the short, relatively low-yielding variety Peragis as parents. Flora (Sv. 0800) is a selection from crosses between these varieties. It is intermediate between its parents in respect of straw length, seed colour, capsule form and tendency to lodge. It is superior to Mahndorf in yield. In trials in 7 regions in Sweden during 1945-52, it outyielded Mahndorf by 9% and Peragis by 14%; the oil production per ha. of Flora averaged 10% more than Mahndorf.—P.J.B.

GENERAL

1494 Desveaux, R. and Kogane-Charles, M. Étude sur la germination de quelques graines oléagineuses. [**Study of germination in some oil seeds.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. A. Ann. agron.* 1952, **3,** No. 3, 385-416, bibl. 40.
A study of the chemical processes taking place in the germination of *Ricinus sanguineus*, *Cannabis sativa* and *Linum usitatissimum* demonstrated the existence of notable differences. In the case of *Ricinus* a considerable increase was observed in the weight of dry matter in the initial seeds, due to a fixation of oxygen at the time of the transformation of the lipides into glucosides. This increase was also found in *Linum* and *Cannabis*, but to a less degree. In all 3 spp. the quantity of non-saponifiable fatty acids increased, sometimes considerably, during the first phases of germination, after which there was a diminution. In *Linum* and *Cannabis* a diminution in the iodine index was observed, in agreement with earlier authors; but in *Ricinus* the iodine index of the albumen was found to increase and that of the seedlings to remain practically constant. The hydroxyle index in the albumen of *Ricinus* increases slightly with age, but in the seedling it is much less than in the albumen and does not increase until the end of germination. The authors' findings on this point are compared with those of previous authors. The neutralization index undergoes only very slight modifications in *Linum* and *Cannabis*, but in *Ricinus* there is an increase of this index in the albumen. Although free-fatty-acids are formed, their quantity is less than that indicated by previous authors. Among these acids, acetic acid was found, in the case of *Linum*, in considerable quantity.—G.M.R.

OTHER CROPS

1495† Onofry, A. El cultivo industrial de "Arundo donax" en Ramallo, (Argentina). [**The cultivation for industrial use of *Arundo donax* in Ramallo, Argentina.**] *Rev. Argent. Agron.* 1952, **19,** No. 3, 133-9, illus.
The large-scale cultivation of the common reed (*Arundo donax*) to provide raw material for the manufacture of hardboard, has been undertaken by a firm at Ramallo, Argentina, because of the difficulty experienced in obtaining adequate local supplies of other raw materials (wheat straw and flax). 2000 ha. of reed are now cultivated in the Ramallo area. The essentials of the system of cultivation are: (1) the cultivation of the soil, before planting, to a depth of 60 cm.; (2) the cultivation of the reed in belts 2 m. wide, separated by belts of the same width on which legumes are grown as a green manure; (3) the periodic removal of the oldest growths of reed. There is a continual advance of the reed-belts across the whole area, the reed being allowed to advance (by rhizome growth) on one side of the belt while a corresponding width of old reed growth is removed on the other side. The reed grows well in regions where maize is grown successfully. 10 to 20 tons of dry reed per ha. are produced per year. Chemical weed control is recommended since machine- or hand-weeding can damage the reed rhizomes.—W.J.B.

LAND USE, SURVEYS AND MANAGEMENT

1496† Wyllie, J. **Agriculture in Kent.** *Brit. agric. Bull.* 1953, **6,** No. 26, 118-23, illus.
A description is given of the soils, the system of land tenure and the chief agricultural areas. A brief reference is made to agricultural research stations.—M.A.

1497† Pissot, P. L'agriculture et l'économie rurale égyptiennes. [**Egyptian agriculture and rural economy.**] *Bull. tech. Inform.* 1952, No. 75, 805-17 ; 1953, No. 78, 301-12, illus.

498† Haughs, M. A. and Imper, A. D. **Crop costs.** *Econ. Rep. 35. N. Scot. Coll. Agric.* 1953, pp. 15.

his report deals with the cost of production of ats, potatoes, turnips and of laying down grass on arms of various types in the North of Scotland ollege area.—M.A.

499 Bellerby, J. R. **Distribution of farm income in the United Kingdom 1867-1938.** *J. Proc. agric. Econ. Soc.* 1953, **10**, No. 2, 127-44.

500† Horring, J. and Riemsbijk, J. F. **Cost accounting and farm management analysis in agriculture in the Netherlands.** *Neth. J. agric. Sci.* 1953, **1**, No. 2, 73-95, bibl. 15, illus.

501 Semkin, G. [**Organization of work for irrigation agriculture in collective farms of the Voronež Province.**] [Russian] *Soc. seljs. Hoz.* (*Social. Agric.*) 1953, **24**, No. 4/5, 32-9, illus.

he paper deals with the labour problems in the oronež Province where the area under irrigation rming in 1952 reached a total of 41.3 thousand ctares. The crops grown include grain/beet ; ain/potatoes ; grain/essential oil plants ; grain/ bacco ; and grain/vegetables.—M.H.

02† Hargrave, J. **The treatment of farm land flooded by sea water.** *Agriculture, Lond.* 1953, **60**, No. 1, 27-30. [NAAS, Eastern Prov.]

review is given of the effect of salt-water flooding on agricultural land and measures for restoring such land to productivity. Notes are given on crops suitable for sowing on salty land.—P.J.B.

1503 Marillonnet, L. Problèmes de mise en valeur des polders aux Pays-Bas. 2. [**The problems of improving the polders in the Netherlands. 2.**] *Agron. trop., Nogent* 1953, **8**, No. 2, 119-75, bibl. 53, illus.

1504 Hooghoudt, S. B. Resultaten van het grondwaterstandsproefveld te Nieuw-Beerta. [**Results of experiments on water-table levels at Nieuw-Beerta (Netherlands).**] *Comm. Hydrol. Res., T.N.O. Proc. Tech. Meet., 1946-50* The Hague, 1952, 56-64, illus., English summary p. 286, French summary p. 313.

High water-tables, kept stable throughout the year, cause a serious depression in the yields of most crops (especially cereals and peas). High water-tables (40 cm. below the surface), maintained from November to February only, caused little decline in yields, provided that the water-tables were sufficiently lowered in spring. On the plots with the highest water-tables, 40 cm. below the surface, it was possible to reduce the depression in yields by applications of N, but not to such a degree that the yields of these plots equalled those of the highest-yielding plots which had water-tables 120-150 cm. below the surface. [See Abs. 1544 and 1586.]—From author's summary.

1505† Granö, O. Die Flora in ihrer Beziehung zur Kultur im Schärenhof von Porvoo in Südfinnland. [**The effect of cultivation on the flora of the Porvoo island group in south Finland.**] *Ann. bot. Soc. zool.-bot. fenn., Vanamo* 1953, **25**, No. 4, 1-47, bibl. 34, illus.

FARMING SYSTEMS AND PRACTICES

06 Neethling, J. C. **Changes in farming systems and land utilization in four cropping areas, since 1937.** *Fmg in S. Afr.* 1953, **28**, No. 323, 55-7 and 72.

hanges in cropping systems and sources of cash turns in the Transvaal high veld, the Caledon ver area, the Western Transvaal and the North-stern Free State are described.—M.A.

07† World Crops. **Development and progress of irrigation in South Africa.** *World Crops* 1953, **5**, No. 6, 232-6, illus.

08 Mundy, H. G. **Some problems of arable farming in Southern Rhodesia.** *Emp. J. exp. Agric.* 1953, **21**, No. 82, 123-30.

A broad review of agricultural systems in Matabeleland and Mashonaland is given with particular reference to green manuring, ley farming and manuring.—M.A.

1509 Anand, D. M. **Dry farming in the Deccan and Karnatak.** *Indian Fmg* 1953, **2**, No. 12, 16-18, 29-30, illus.

The practice of dry farming by field-bunding, improved tillage, manuring, rotations and strip cropping is described.—M.A.

1510† Novskov, F. [**Stability and flexibility of crop rotations.**] [Russian] *Soc. seljs. Hoz.* (*Social. Agric.*) 1953, **24**, No. 3, 27-36.

The development of the type of rotations used in certain collective farms in the Soviet Union since 1933 is described.—M.H.

1511† SEMKO, P. [**Prospects of collective farming in the region of the Southern Ukrainian Irrigation Canal.**] [Russian] *Soc. seljs. Hoz.* (*Social. Agric.*) 1953, **24,** No. 2, 41-5.

1512† POMUS, M. I. [**The Kulundinsk steppe.**] [Russian] *Priroda, Moskva* (*Nature, Moscow*) 1953, **42,** No. 6, 77-83, illus.

The climate, geography, soils and plant cover of the region (which lies approx. 53°N. lat., 80° E. long.) are described. Agronomical measures which enable the collective and State farmers in the area to overcome the effects of drought include: mechanization of agricultural processes; conservation of snow and water, and the construction of shelter-belts. The Kulundinsk summer is longer than that in other regions of Siberia. The warm period (with average temperatures above zero) usually lasts for 200 days and the frost-free period from 120 to 130 days. The average yearly sunshine in Aleĭsk is 2130 hours, i.e., 35% greater than in Moscow, and almost similar to that of the southern shores of the Crimea. 75% of the sunshine occurs in the vegetation period. The plans for developing the agriculture in the region are discussed with special reference to wheat, oats, rye, buckwheat, sunflower, millet, sugar-beet and groundnut.—M.H.

1513† VINE, H. **Experiments on the maintenance of soil fertility at Ibadan, Nigeria, 1922-51.** *Emp. J. exp. Agric.* 1953, **21,** No. 82, 65-85, bibl. 17.

Ibadan may be considered to be representative of a large part of western Nigeria, and an even larger area in the Gold Coast, covered by the dry-forest zone and the northern part of the rain-forest zone. The encroachment of savannah vegetation from the north extends over about one-third of the dry-forest zone in western Nigeria because of bush fires following on frequent clearing of land for cultivation. The soils of these parts of Nigeria and the Gold Coast range, in the main, from loose, brownish top-soils over porous to yellowish sand to sandy-clay sub-soil layers, of free or very free internal drainage, situated on gentle to moderate slopes. A feature of these soils is the marked increase of acidity with depth. The C/N ratio in the forest zone soils is between 10 to 12, while in the Savannah zone, although the amount of humus is about the same, the C/N ratio is higher and nitrate is deficient in at least the first season on newly-cleared land. Early rotations from 1922-33 at Moor Plantation, Ibadan, depended on a system of green manuring with *Mucuna deeringiana* to conserve fertility and procure adequate yields of yams, cotton, maize and groundnuts. The fact that Mucuna when burnt or dug in dry resulted in onl a slight reduction in yield of the succeeding cro compared with Mucuna dug in green, prompte the undertaking of various rotation systems t investigate the hypothesis that Mucuna had stimulating effect on organisms affecting the content of the soil. The rotation changes, whic involved more intensive use of the land, resulte in a loss of soil fertility and experiments wer begun in 1944 to determine the effect of N, P an K fertilizers applied to the early maize crop combined with the treatments of digging in and burn ing Mucuna. Burning of Mucuna appeared to mak phosphates available at an early stage in the growt of maize, while digging in Mucuna resulted i higher concentrations of total N and nitrates lat in the plant's growth. The article emphasizes tha the earlier rotations were designed to ensur fertility at a time when the application of artificia manures would have been uneconomic. At presen the use of N fertilizers, without green manure seems more economic. The importance of havin fallow periods under dense vegetative growth fo a longer time than that for which Mucuna cover the ground is stressed, and the use of mixture of *Centrosema pubescens* with certain grasse (notably *Cenchrus* sp.) is suggested as an alterna tion of cropping and grass/legume fallow would b very appropriate to mechanization. Where stron bushy growth regenerates after each period cropping, good crops are obtained and it is considered doubtful whether farmers should be recom mended to make any change; but where regrowt is of savannah or transitional type, yields coul be generally improved by the introduction of legume cover. Deterioration of the savannah coul be checked by the control of burning and b restrictions on the cutting of poles and firewoo in fallow land. The main conclusions are that: 1 Yields can be maintained at a good level for considerable periods of continuous cultivation withou the use of fertilizers. 2. Fertility is lost rathe slowly if continuous cultivation is prolonged fo more than about ten years. 3. In the long run, th nitrate supply is the main controlling factor i Moor Plantation soils, whilst available phosphat is less important as a limiting factor. 4. When lan has previously been rather intensively cropped f some years, Mucuna (the main green-manure cro tried) is generally beneficial to the yield of the cro immediately following it. 5. Incorporation leguminous green manure results very rapidly i production of nitrate in the soil, and it is th factor which is responsible for the good effect o the following crop. 6. Short-term green manure (such as Mucuna) do not produce any lasting i creases in the amounts of humus and total in the soil, and may not serve to prevent th gradual loss of humus and N from the soil. 7. Whe the amount of humus and total N have becom nsiderably depleted through continuous cropping, ort-term green manures alone do not appear to capable of maintaining adequate nitrate supplies d high crop-yields in intensive rotations.—M.A.

14† THERON, J. J. and HAYLETT, D. G. **The regeneration of soil humus under a grass ley.** *Emp. J. exp. Agric.* 1953, **21,** No. 82, 116-22, bibl. 7. [Fac. Agric., Univ. Pretoria]

the summer-rainfall areas of the Union of South frica crop yields have declined in recent years, ie partly to loss of top-soil through erosion but ainly to the depletion of organic matter occa- oned by repeated tillage. The introduction of long sting-periods under perennial grasses has been vocated, but without added artificial manures e C/N ratio cannot be maintained. Due to the lure to establish legumes, the main supply of would have to come from nitrogenous fertilizers. a field which had been under annual crops for years, Rhodes grass (*Chloris gayana*) was sown in latter part of the 1940-1 season and, in Novem- r 1951, 3 rates of superphosphate and 4 rates of monium sulphate in combination were applied, d thereafter, annually. The 12 treatments were licated 4 times. The response to the fertilizer atments was measured by determining total ld as well as the content of crude protein and osphorus of the air-dry hay. On the plots treated h ammonium sulphate, Rhodes grass was idly displaced by *Paspalum dilatatum*. During winter of 1948 soil samples were taken, the d ploughed and the plots used for growing ize. The results showed that only when the mands for N for the regeneration of humus were ly satisfied by relatively heavy applications of 2000 lb. ammonium sulphate per morgen [1 morgen = 2.1165 ac.] could the unhampered production of herbage take place. Such factors as the profitability of applying heavy dressings of N, the possible acidification of the soil consequent on heavy dressings of sulphate of ammonia, and the original level of fertility of the land must be considered. The application of superphosphate had no significant effect on the yield of hay or protein, but it increased the percentage phosphate in the hay. It is concluded that, in the absence of a suitable legume, the grass ley can fulfil its essential purpose of replenishing the humus content of a soil and regenerating its crumb structure, only if the grass occupies the soil for a period of more than 3 years, is not grazed excessively, and is, in addition, heavily manured with nitrogenous fertilizers. —M.A.

1515 SCHROEDTER, H. Zur phytopathologischen Problematik von Windschutzanlagen. [**Phytopathological problems of shelter-belts.**] *NachrBl. dtsch. PflSchDienst* N.S. 1952, **6,** No. 5, 91-2, bibl. 4. [Agrarmeteorol. Forsch-Sta., Aschersleben]

The changes in climatic conditions brought about by the establishment of shelter-belts are especially noticeable in the microclimate of mixed cultures in which strips of a tall plant, e.g. maize, are grown to protect more sensitive, low-growing plants. There is a tendency for the relative humidity to increase and for conditions to become more favourable for dew formation, factors which make for greater liability to fungus development and attack.—G.M.R.

SOIL AND WATER CONSERVATION

6† WOODHAM, K. M. **Soil conservation in the south-west wheat belt of N.S.W.** *J. Soil Conserv. N.S.W.* 1953, **9,** No. 2, 81-4, illus.

lescription is given of the work of the soil con- vation service in controlling erosion near West along by means of various level works.—M.A.

7 HILL, W. W. and POWERS, W. L. **Land capability for soil and water conservation in Oregon.** *Sta. Bull. 530. Oregon agric. Exp. Sta.* 1953, pp. 30, illus.

ef notes are given on factors affecting land acity and use, together with the land capability racteristics of the 6 main regions of Oregon. abulated summary of the land capability classi- tions applicable to Oregon is given, with a map wing the extent of the areas of the 8 major l capability classes.—P.J.B.

1518 HARROLD, L. L. and DREIBELBIS, F. R. **Water use by crops as determined by weighing monolith lysimeters.** *Proc. Soil Sci. Soc. Amer.* 1953, **17,** No. 1, 70-4.

Studies during 1941-51 near Coshocton, Ohio, are reported on the water use of crops in 4-course rotations of maize/wheat/ 2-years' pasture, grown on 2 silt-loam soils. On Muskingum and Keene silt loams, the average weight of water used by maize during the growing season was 438 and 421 lb., respectively, per lb. of dry matter produced ; for wheat, respective figures were 624 and 641 lb., and for pasture 945 and 1238 lb. water per lb. of dry matter. Annual evapo-transpiration on Muskingum silt-loam averaged 23.26, 25.3 and 25.66 in. of water for maize, wheat and pasture, respectively ; on Keene silt-loam, respective figures

were 26.42, 28 and 26.03 in. Evapo-transpiration consumption of water was greater on the relatively heavy Keen silt-loam, than on the lighter Muskingum soil. Data are presented on the accretio
depletion and storage of soil water as indicated l
the lysimeter studies.—P.J.B.

WEEDS AND WEED CONTROL

(See also under individual crops.)

1519 FARMER'S WEEKLY, BLOEMFONTEIN. **Control of witchweed now possible.** *Frmr's Wkly, Bloemfontein* 1953, **85,** 43.

Witchweed [*Striga lutea*] is a serious pest of maize in both the western and eastern Transvaal. Experiments carried out at Potchefstroom University and in the field have shown that by planting sunflowers and cowpeas on land affected by this pest, germination of the witchweed was encouraged without damage to these crops, as the witchweed was unable to parasitize sunflowers and cowpeas. After two years of this cropping, maize was planted and grew well, whereas maize planted on plots sown to maize in the previous two years was badly parasitized by witchweed so that plants grew to only about 2 ft. high. A rotation of sunflower and cowpea with the maize crop is recommended as a means of controlling witchweed.—M.A.

1520† SINGH, T. C. N. **Biological eradication of *Saccharum spontaneum* Linn. (kans).** *Proc. 40th Indian Sci. Congr. 1953* Pt. 3, 146-7. [Annamalai Univ., Annamalainagar. S. India]

Healthy clumps of kans, *Saccharum spontaneum*, died out when plots on which they grew were invaded by basket grass (*Rottboellia myurus*). Clumps of *S. spontaneum* grown in pots and irrigated fortnightly with root washings from basket-grass were killed within a period of 6 months, whereas clumps irrigated fortnightly with untreated water remained vigorous. *R. myurus* yields fodder of fair quality and can also be used to check erosion.—W.J.B.

1521 RIEPMA, P. Het voorkomen en de bestrijding van duist. [**The prevention and control of blackgrass.**] *LandbVoorl.* 1953, **10,** No. 5, 222-4, bibl. 4, illus.

The frequency of occurrence (measured according to the scale of Zandstra and de Vries) of blackgrass (*Alopecurus agrestis*) was determined on experimental plots which differed in respect of the type of crop grown on them and in soil-structure. Blackgrass occurred more frequently in autumn-sown than in spring-sown crops. The frequency of blackgrass in pea crops (2.2.) was much higher than in any other spring crop. The incidence of the weed was higher on soils of poor structure than on soils of good structure.—W.J.B.

1522 ALPHEN de VEER, E. J. van and VINK, A. P. A. Bestrijding van alang-alang m
mechanische en chemische middelen. [M
chanical and chemical control of lala
grass.] *Bergcultures* 1952, **21,** No. 22, 468-
bibl. 6, illus. [C. P. V. Res. Sta. and F
Res. Inst., Bogor, Java]

Chemical and mechanical methods of controlli
lalang grass (*Imperata cylindrica*) were compar
over the period August-October, 1951. Shell wee
killers, K and T, were applied by means of han
spraying equipment, 3 or 4 times during the peri
the total applications varying from 185-250 g
per ac. The mechanically-treated plots were cul
vated 2, 3 or 4 times with a heavy disc-harr
(the Rome "disc ploughing harrow") or, if co
ditions permitted, with a lighter disc-harrow, to
depth of 6 in. Where only 2 cultivations we
carried out, the harrowing was followed by
application of weedkiller K. The chemical trea
ments did not give effective control of the lala
and heavier applications of weedkillers would ha
been uneconomic. Disc-harrowing 3 or 4 times ga
good control of lalang. Two cultivations gave
satisfactory control, even when followed by
application of weedkiller. Although a gree
manure crop, *Acaciella laevis*, which was sown
the plots after the completion of the mechani
cultivations, failed to grow, there were or
occasional regrowths of lalang and, in gener
spontaneous growths of harmless grasses a
legumes eventually covered the disced plo
Recommendations are given for the establishme
of leguminous crops, with the aid of wood-ash
artificial fertilizers, immediately after the succe
ful eradication of lalang. The cost of controlli
lalang by means of shallow disc-cultivations is h
the cost of hand-eradication.—W.J.B.

1523† CHEVALIER, A. Deux Composées permetta
de lutter contre l'*Imperata* et empêchant
dégradation des sols tropicaux qu'il faudr
introduire rapidement en Afrique noi
[**Two species of Compositae controll**
***Imperata* and preventing the degradation**
tropical soils, which should be introdu
quickly in tropical Africa.] *Rev. int. E*
appl. 1952, **32,** No. 359-60, 494-6, bibl.
[Mus. nat. Hist. naturelle, Paris]

The 2 species described for Indo-China are *Eu*
torium odoratum, an annual shrub growing alm
wild in the areas subject to bush fires, where
supplants *Imperata cylindrica* and protects

il, and *Tithonia diversifolia*, grown as cover crop
the red soils of South Annam, where species of
e genera *Crotalaria* and *Tephrosia* are unsuccess-
l. *T. diversifolia*, where cut periodically for mulch-
g, would also control *I. cylindrica*.—E.B.O.

24 Muñoz-Orozco, E. El control de las cyperaceas (cortadera, coquito etc.) con las diferentes mata-malezas. [**Control of weeds of the family Cyperaceae, including nutgrass, with various herbicides.**] *Acta agron., Palmira* 1953, **3**, No. 2, 99-121, bibl. 19, illus.

evious work on the subject of controlling nut-
ass (*Cyperus rotundus*), *C. ferruginescens* and
chromena ciliata, by the use of herbicides, is
viewed. *C. rotundus* is a weed of plantations, *C.*
ruginescens of rice-fields and *D. ciliata* of field
ops and pastures in Columbia. Applications of
rious concentrations of 2,4-D (acid, sodium salt
d ester) and of 2,4,5-T (acid and ester) were
ade to soil containing seeds or bulbs of the 3
asses, and to the grasses themselves at different
ges of development. Applications of 2,4-D
id and sodium salt) to soil in boxes at the rate
4 mg. per kg. of soil reduced the total germina-
n of *C. ferruginescens* seeds to 10-12%. Developed
ants of *C. ferruginescens* were most effectively
ntrolled by 2,4-D (acid or sodium salt) applied
concentrations of 1000-3000 ppm. The lowest
ncentrations were required when the grass was
weeks old and about 25 cm. high. Soil-treatments
th herbicides were all ineffective against the
lbs of nutgrass (*C. rotundus*). Sprays of acid
-D applied at a concentration of 1500 ppm.
the flowering-stage, gave a complete kill both
the above-ground portions of nutgrass and of the
lbs to a depth of 10 cm. Acid 2,4,5-T also gave
od control of nutgrass. A mixture of equal parts
acid 2,4-D and acid 2,4,5-T applied at the rate
2 kg. of active material per ha. gave good control
Dichromena ciliata growing in a pasture.—W.J.B.

25 Willis, S. J. ***Cardaria draba*—a globe-trotting weed.** *World Crops* 1953, **5**, No. 8, 310-12, bibl. 18, illus.

ormation from various sources on hoary pepper-
rt, *Cardaria draba*, which is widespread in
nperate countries, is reviewed. *C. draba* adapts
elf to a wide range of ecological conditions and is
veed of both arable land and pasture. It can be
ntrolled by the cultivations associated with a
ies of spring-sown cereal crops and by spraying
se crops with MCPA at the rate of 2 lb. per ac.—
.B.

6 Longchamp, R. and others. Recherches sur l'action du 2,4-D et du MCPA sur *Chrysanthemum segetum* L. [**Investigations into the action of 2,4-D and MCPA on *Chrysanthemum segetum*.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. B. Ann. Amélior. Pl.* 1952, **2**, 329-35, bibl. 3, illus. [Versailles and Paris]

Total destruction was achieved only when a strong application of the sodium salt of 2,4-D (5-10 kg. free acid per hectare) was made at the time of flowering.—M.A.

1527† Lavers, D. W. **Green cestrum—A plant poisonous to stock.** *Qd agric. J.* 1953, **76**, Pt. 3, 160-1, illus.

Green cestrum (*Cestrum parqui*) is now a common naturalized alien in S.E. Queensland. Methods of eradication consist of regular pulling or cutting of the parent plant below soil level and the removal of suckers as they appear.—M.A.

1528 Bennets, H. W. **Poison plants of Western Australia.** *J. Dep. Agric. W. Aust.* 1953, **2**, No. 2, 216-21, illus.

A description of 7 *Datura* species is given.—M.A.

1529† Cock, R. E. **Noxious weeds of Tasmania.** *Tasm. J. Agric.* 1953, **24**, No. 2, 132-4, illus.

Three noxious weeds of Tasmania are described, cape-weed (*Cryptostemma calendulaceum*), greater convolvulus (*Calystegia sepium*) and Californian stinkweed (*Gilia squarrosa*). Special identification points are emphasized. Methods of control are given.—Author's summary.

1530 Roberts, H. A. **Weed investigations.** *Rep. Brit. Soc. Promot. veg. Res. 1952* 1953, 41-2, bibl. 2. [Nat. Veg. Res. Sta., Warwick]

Exploratory tests with CMU on weeds in several vegetable crops were made at Wellesbourne during 1952. At the rate of 0.5 lb. in 100 gal. water per acre a kill of over 80% of such species as *Chenopodium album* (fat-hen) and *Stellaria media* (chickweed) was obtained. *Fumaria officinalis* (fumitory) flourished on all treated plots and *Veronica hederifolia* (ivy-leaved speedwell) also appeared to be relatively tolerant to CMU.—M.A.

1531 Collins, W. B. and Everett, C. F. **CMU experiments at Fredericton** [**Canada**]. *Proc. 5th Meet., East. Sect., Nat. Weed Cttee, Canada 1951* 1952, 39-40.

Applications of 0.25, 0.5, 1, 2 and 3 lb. CMU per ac. were made on 26 June to potatoes, turnips, carrots, field beans, fodder maize, wheat and oats, one day after sowing. Control of annual weeds following treatment with 0.25 lb. CMU per ac. ranged from little to 80%; couch grass [*Agropyron repens*] was little affected. Treatments with 2 lb. CMU per ac. gave 90-100% control of annual weeds, and reduced couch grass stands by 50%. CMU gave good control of spurrey [*Spergula arvensis*] and smartweed [*Polygonum* sp.]. Turnips were completely eliminated by all rates of CMU. Field beans, wheat, oats and barley were injured by application of 0.5 lb. CMU per ac., while maize and potatoes were injured by rates of 1 lb. and above per ac.—P.J.B.

1532 Gallup, A. H. **The absorption and respiratory effect of 2,4-dichlorophenoxyacetic acid as factors contributing to selective herbicidal activity.** *Dissert. Abstr.* 1953, **13,** No. 3, 288-9. [Univ. Michigan, East Lansing]

In studies on monocotyledonous and dicotyledonous plants, using 2,4-dichloro-5-iodo^{131}-phenoxyacetic acid, beans, sunflowers, dandelion [*Taraxacum officinale*] and plantain [*Plantago lanceolata*] absorbed more of this compound than did oats, maize, wheat, or orchard grass [*Dactylis glomerata*]; also, translocation of the compound was slower in the monocotyledonous than in the dicotyledonous plants. The presence of an intercalary meristem in monocotyledonous plants is suggested as a reason for the relatively slow translocation. In comparisons of the O_2 uptake by bean, wheat, oat and sunflower plants, following treatment with 2,4-D, the O_2 uptake by bean and sunflower plants was greater, and took place at lower 2,4-D concentrations, than in the case of wheat and oat plants. The inhibition of O_2 uptake following treatment with relatively high concentrations of 2,4-D took place at about the same concentration of 2,4-D in all 4 species. It was concluded that the selective effects of 2,4-D as between monocotyledonous and dicotyledonous plants, were largely due to differences in the respiratory effects of growth substances.—P.J.B.

1533 Åberg, E. Modern ogräsbekämpning. [**Modern weed control.**] *K. LantbrAkad. Tidskr.* 1952, **91,** No. 4, 227-45, bibl. 45, English summary pp. 242-3.

The subject is reviewed with particular reference to Swedish conditions. The need for the complementary use of mechanical, rotational and herbicidal means for controlling weeds is stressed. Sodium chlorate as a herbicide has almost disappeared from use in Sweden. For controlling couch grass (*Agropyron repens*), 100 kg./ha. of TCA has been effective. On newly-ploughed land, where some of the weed stolons were exposed on the soil surface, 50 kg. per ha. has been sufficient. The best time for treatment has been in July or August, before a spring-sown crop. When combined with mechanical and rotational measures to control wild oats (*Avena fatua*), IPC at a rate of 5 kg. of active material per ha. has given good, though not complete, control. DNOSBP has proved particularly well adapted for weed control in peas and linseed. Rates of 0.8 to 1 kg. per ha. for peas and 0.7 to 0.8 kg. per ha. for linseed, together with not less than 500 l. per ha. of water, is recommended. At low temperatures (15°C.), 1 kg. per ha. is suitable for peas, while at temperatures over 25°C
0.7 kg. per ha. is the maximum safe rate of trea
ment. Notes are given on growth stages at whic
cereals, flax and linseed are sensitive to 2,4-D an
MCPA. The cause of abnormalities in weed ar
crop plants following treatment with MCPA ar
related compounds is discussed. For sprayir
cereal crops undersown with legumes, treatmer
with 5 to 8 l. per ha. of Agroxone (MCPA formul
tion) not less than 4 weeks before emergence of tl
cereal crop is recommended.—P.J.B.

1534 von Hofsten, C. G. Besprutning mot ogr
kräver vidgad anpassning till lokala o
tillfälliga förhallånden. [**Herbicidal spr
procedures for weed control require great
modification to suit local conditions.**] *Lant
Svenskt Land* 1953, **37,** No. 17, 399-40
415 and 418.

Observations are given on the practical implic
tions of temperature, time of day and rate
application of selective herbicides for weed contr
in field crops in Sweden.—P.J.B.

1535 England and Wales. Ministry of Agr
culture and Fisheries. Form A(PS)
**Precautions in the use of weed-killers ar
insecticides containing dinitro- and organ
phosphorus compounds.** 1953, pp. 11.

This leaflet summarizes the provisions of tl
Agriculture (poisonous substances) Regulation
1953.—M.A.

1536† Jacks, H. **Soil disinfection. 14. Effect
chemical soil disinfectants on control
weeds.** *N. Z. J. Sci. Technol.* 1953, Sect.
34, No. 6, 487-91, bibl. 3. [Dep. Sci. Indust
Res., Auckland, N.Z.]

The effect on weed control of chloropicrin, D
Formalin, Iscobrome II [given in this pap
variously as Isobrome, Iscobrome and Iseobrome
carbon disulphide, and mixtures of chloropicri
and DD, and chloropicrin and Isobrome II wa
investigated. Chloropicrin was more effective tha
other materials. Although both chloropicrin an
DD, in general, considerably reduced emergen
of wood weed seeds, neither gave satisfactory co
trol of clover and grass seeds.—Author's summar

1537 Vengris, J. and others. **Chemical compos
tion of weeds and accompanying cr
plants.** *Agron. J.* 1953, **45,** No. 5, 213-1
bibl. 13. [Mass. Agric. Exp. Sta., Amherst]

Data are given of the N, P, K, Ca and Mg conte
of maize and potatoes and of a number of commo
weed species growing in association with the
crops. Almost all weeds accumulated considerabl
more N, P, K, Ca and Mg than the associat
maize plants. The content of these elements w
much greater in the weeds than in the associat

otato tubers, while these differences were uch smaller between the potato tops and the ssociated weeds. Many weeds appeared to be able o utilize soil P which was normally unavailable o the crop plants.—P.J.B.

538† BROAD, P. D. **The occurrence of weed seeds in samples submitted for testing by the O.S.T.S.** *J. nat. Inst. agric. Bot.* 1952, **6,** No. 2, 275-86.

n a survey of the frequency with which certain eed seeds occurred in samples of crop seeds sub- itted for testing at the Official Seed Testing Sta- on [Cambridge ?] in 1951-2, seeds of some 250 eed species belonging to 39 botanical families ere found. There was no evidence from records f earlier years to suggest that the occurrence of eds of wild oat (*Avena fatua*) in cereal samples is, any way, responsible for the increased infestation with this weed that has occurred in recent years.—C.L.S.

1539† DALES, H. **An investigation into the advisability of reporting weed seed impurities by number per ounce rather than by percentage by weight. Appendix B, 14th Conference of Seed Analysts. 16th July, 1952.** *J. nat. Inst. agric. Bot.* 1952, **6,** No. 2, 270-4.

To investigate whether the quality of a seed sample would be better shown if the weed-seed content were expressed by number rather than by weight, a survey was made of over 2700 samples of crop seeds tested at the Official Seed Testing Station for Northern Ireland during 1947-8. It was concluded that seed impurity expressed by number would be of more practical value to the farmer than the same impurity expressed by weight.—C.L.S.

CROP BOTANY

540 MARCHI, V. Introduzione alla ecologia agraria. [**An introduction to agricultural ecology.** *Riv. Ecol.* 1952, **2,** No. 2, 156-200, bibl. in text, English trans. pp. 178-200.

541† BOERGER, A. Genetica de la inmunidad vegetal en el Rio de la Plata. [**Genetics of plant immunity in the River Plate region.**] *Arch. fitotéc., Uruguay* 1952, **5,** No. 1, 55-93, bibl. 322, English summary p. 173.

comprehensive account is given of the work rried out on the genetics of plant immunity in e River Plate region, with special reference cultivated plants which include wheat, aize, sorghum, rice, oats, barley, linseed and tatoes. Appended to this account is a biblio- aphy of world literature relevant to the breeding d successful use of crop varieties resistant to e diseases prevalent in the River Plate region. he River Plate region includes parts of rgentina, Uruguay and the Rio Grande do Sul, azil.]—W.J.B.

42 BARTON, Lela V. **Relation of different gases to the soaking injury of seeds. 2.** *Contr. Boyce Thompson Inst.* 1952, **17,** No. 1, 7-34, bibl. 22, illus.

trials with bean, oat and maize seed, passing O_2 through the solution in which the seed was aked prevented injury to the seed by salt solu- ons, selenium salts, 2,4-D and through excessive take of water, and increased the resistance of aize seed to low temperatures. Under the same nditions, passing O_2 through the soaking water d a consistently deleterious effect on the seed causing excessive uptake of these materials. Rice seed was not injured by the presence of O_2 in the soaking water, while CO_2 delayed water absorption and germination. The implications of these findings concerning CO_2 are discussed in relation to using this gas to regulate the uptake of plant nutrients dissolved in the soaking water. The use of such techniques may render it possible to incorporate nutrient elements and deficient micronutrients in the seed prior to sowing. [See also *Fld Crop Abstr.* 3 : 1507.]—P.J.B.

1543† HAAS, H. J. and ROGLER, G. A. **A technique for photographing grass roots in situ.** *Agron. J.* 1953, **45,** No. 4, 173, illus. [U.S. North. Gt Plains Fld Sta., Mandan, N. Dak.]

The technique entails digging a trench to expose the roots, removing about 2 in. of soil behind the roots by water spray and then spraying the roots with white paint. The paint on the soil behind the roots is removed, leaving the roots well defined for photographing against the soil background.—P.J.B.

1544 GOEDEWAAGEN, M. A. J. Grondwaterstand en beworteling der gewassen. [**Root development of crops in relation to depth of watertable.**] *Comm. Hydrol. Res. T.N.O. Proc. Tech. Meet., 1946-50* The Hague, 1952, 65-82, illus., English summary pp. 285-6, French summary pp. 314-15.

The various conditions capable of hampering the downward development of plant roots are discussed. The roots of rape were shown to have a greater penetrating capacity than those of rye. In experiments carried out with potatoes in 1943 it was found that the growth of potato roots in troughs containing sandy-clay soil was impeded when the water-table was artificially maintained at 80 cm. or less below the surface level. Studies were made in June, 1943, of the growth of potatoes of the variety Bintje, which were growing on sandy-clay polders on the island of Schouwen, where the level of the soil surface varied from 40 to 200 cm. above the water-table. The optimum depth of water-table was found to be 110-120 cm. At any given depth of water-table the density and depth of root development were greater where larger quantities of clay particles were present in the soil. In a field experiment on heavy clay soil the depth of penetration of wheat roots and the yield of grain and straw increased progressively over the range of water-table depths 0-150 cm., but at depths of over 100 cm. yields were less markedly benefited than root development by the increasing depths of the water-table. The results of further experiments with mustard grown on loamy sand, in cylinders 100 cm. deep, with water tables artificially maintained at different levels and provided with varying quantities of fertilizers, were summarized as follows: (a) the growth of mustard plants increased at all levels of nutrient supply with progressively deeper water-tables, (b) N and, to a lesser extent, P stimulated plant growth at all depths of water-table tested, (c) even at a water-table depth of 90 cm., the plant growth was seriously impeded (compared with that in cylinders which had no water-table but were constantly watered) since the soil was almost saturated up to 45 cm. above the water-tables, (d) with water-tables at 50-90 cm. below the surface it was possible to compensate for the shortage of N (caused by the excessive height of the water in the cylinders), but not for the shortage of P, by the addition of reasonable quantities of nutrients to the soil. [See Abs. 1086 and 1504.]—W.J.B.

1545† SIDORIN, M. I. [**The absorption of dispersed solar radiation by leaves of crop plants.**] [Russian] *Bot. Ž. SSSR* (*Bot. J. USSR*) 1952, **37,** No. 6, 781-97, bibl. 10. [Moscow Inst. Agric. Engng]

1546 HUEBNER, R. Eine neue Methode der Blattdickenmessung an landwirtschaftlichen Kulturpflanzen. [**A new method of measuring the leaf thickness of crop plants.**] *Z. Acker- u. Pflbau* 1952, **95,** No. 4, 381-8, illus. [Göttingen]

A leaf stamp-cutter was used in combination with an ordinary micrometer. For measuring the mean leaf-thickness of grasses, leaf samples of 1 sq. cm. (30 mm × 3.3. mm.) can be held in a frame containing six such samples for placing in the jaws of the micrometer.—M.A.

1547† SIVADJIAN, J. La transpiration des plantes, son importance économique et son étude par la méthode hygrophotographique. [**Plant transpiration, its economic importance and its study by the hygrophotographic method.**] *Oléagineux* 1953, **8,** No. 6, 367-70, bibl. 30, illus. [Inst. Pasteur, Paris]

A simple and rapid method for measuring the intensity of plant transpiration is briefly described The leaves to be examined are applied against a sensitive photographic plate. The resulting image reflects, by its depth of tone, the intensity of transpiration at the leaf-surface at the time of its application to the plate.—E.B.O.

1548† STILES, W. **The mechanism of photosynthesis. Dark and photochemical reactions.** *Times Sci. Rev.* 1952, No. 4, 4 and 7.

Past and present research on the mechanism of photosynthesis is briefly reviewed and the argument against the theory of the photoreduction of carbon dioxide to formaldehyde outlined. Radio-active isotopes of carbon and oxygen have been used to effect in determining the source of these substances for their synthesis within the plant. Experiments with both unicellular algae and leaves showed that after a very short exposure to light a considerable number of substances containing radio-active carbon appear in the plant. These include glycero-phosphoric acid and other organic phosphorus compounds, in addition to alanine serine, malic acid, sucrose and other sugars. With high light-intensity phospho-glyceric acid is the first recognizable substance to appear while with low light-intensity there are two independent reactions by which CO_2 is fixed, one leading to the formation of phospho-glyceric acid and the other to malic acid. The amounts of both malic acid and phospho-glyceric acid fall with time, while the amount of sucrose continuously increases. Various suggestions are made as to how these two substances arise and as to their fate.—M.A.

1549† TOMBESI, L. and others. Intensità fotosintetica e respiratoria, attività ossidasica catalasica, carboanidrasica, perossidasica e contenuto in glutatione ridotto ed acido ascorbico durante alcune fasi de ciclo vegetativo della pianta. [**Photosynthetic and respiratory intensities, oxidase, catalase, carboanidrase, peroxidase activities and reduced glutathione and ascorbic acid content during some phases o the vegetative cycle of a plant.**] *Ann. Sper agr.* 1953, **7,** No. 1, 5-15, bibl. 8, illus. English summary pp. 14-15. [Sta. Chim. Agr. Sper., Roma]

This investigation was conducted on leaves o *Brassica rapa* var. *oleifera* and var. *esculenta* during growth, flowering and fructification.—E.B.O.

550† LIND, E. F. and others. **Partial separation of the plastid pigments by paper chromatography.** *Pl. Physiol* 1953, **28,** No. 2, 325-8, bibl. 3, illus. [Dep. Bot. Pl. Physiol., Iowa State Coll., Iowa.]

551† ILJIN, W. S. **Causes of death of plants as a consequence of loss of water : conservation of life in desiccated tissues.** *Bull. Torrey Bot. Cl.* 1953, **80,** No. 3, 166-77, bibl. 31. [Soils Dep., Minist. Agric., Maracay, Venezuela]

[n the studies reported, it was found that slow lesiccation of cells enabled them to retain their vitality even after the loss of most of their cell noisture, whereas rapid desiccation and rapid restoration of the cell moisture resulted in death. Cells were increasingly unable to withstand repeated desiccation and restoration of cell moisture owing to cumulative injury to the protoplasm. After such treatment, even slight changes in cell turgor resulted in death. Cells with large vacuoles were less resistant to desiccation than were cells with small vacuoles. Notes are given on the correlations between resistance to desiccation and cell size and shape, osmotic sap concentration and ratio of volume to surface area of cells. It was concluded that desiccation itself was not the cause of protoplast death, but that protoplasm injuries caused by rapid desiccation, or restoration of cell noisture, were responsible for cell death.—P.J.B.

1552 KLEIN, W. H. and LEOPOLD, A. C. **The effects of maleic hydrazide on flower initiation.** *Pl. Physiol.* 1953, **28,** No. 2, 293-8, bibl. 5, illus. [Dep. Hort., Purdue Univ., Lafayette, Indiana]

Maleic hydrazide was found to inhibit completely the formation of flower primordia in Wintex barley, a long-day plant, at concentrations as low as 4 × 10^{-5} M. The effective inhibitory concentration of naleic hydrazide was found to vary with the age and size of the plant. Photoperiodic induction of Biloxi soyabean, a short-day plant, was inhibited somewhat by maleic hydrazide but the treatment did not completely suppress floral initiation. The apex died back after treatment with approximately ·0 × 10^{-5} M maleic hydrazide. Evidence was brought forth suggesting that maleic hydrazide nhibits the production of flower primordia primarily through its inhibitory effect on growth, rather than by any specific action against the photoperiodic mechanism itself.—From authors' ummary.

553† VLITOS, A. J. and MEUDT, W. **The role of auxin in plant flowering. I. A quantitative method based on paper chromatography for the determination of indole compounds and of 3-indoleacetic acid in plant tissues.** *Contr. Boyce Thompson Inst.* 1953, **17,** No. 3, 197-202, bibl. 17.

1554† HARLAND, S. C. **Plant hormones.** *J. roy. Soc. Arts* 1953, **101,** No. 4895, 298-307. [Univ. Manchester]

The significance of plant hormones in improved agricultural practice is stressed, the history of their discovery outlined and their future discussed.—M.A.

1555 ZELLER, A. von. Wirkstoffe als Wurzelausscheidungen von Kulturpflanzen. I. Testpflanzen. [**Hormones as root excretions of cultivated plants. 1. Test plants.**] *Veröff. Bundesanst. alp. Landw., Admont* 1952, No. 6, 124-37, bibl. 10, illus.

As a preliminary to wider investigations into the effect of hormone excretion by plant roots on such problems as soil sickness and interrelationships of plants in mixed stands, a study of the effect of varying concentrations of α-naphthylacetic acid on the root elongation of selected plants was undertaken. The reaction of the plants *Camelina sativa*, *Brassica napus*, *Triticum vulgare* and *Cucumis sativus*, as measured by seedling root lengths, to concentrations of from 10^{-5}g./ccm. to 10^{-12} g./ccm. of this acid is shown.—M.A.

1556 DOXEY, D. **The use of radioactive iodine in the study of a plant growth-regulator.** *J. exp. Bot.* 1953, **4,** No. 10, 53-8, bibl. 8. [Jealott's Hill Res. Sta., Bracknell, Berks.]

2-iodo-4-chlorophenoxyacetic acid (ICPA) labelled with I^{131} was applied in the form of a 0.25% olive oil solution (using 2.5% ethyl alcohol as accessory solvent) to the upper leaf surface of young broad bean and oat plants at the rate of 0.01 ml. solution per plant. The initial activity of the solution was 3.75 mc. per ml. Epinastic effects were induced in the bean but not in the oat. The movement of the I^{131} within the plant was followed by means of autoradiographs. Results indicate rapid absorption and translocation of a high proportion of the applied material in the broad bean, radioactivity appearing in quantity in every part of the plant within 27 hr. of treatment, with a marked concentration at the upper end of the stem and another at the lower end of the stem and top of the tap root. In the oat, on the other hand, absorption and translocation were much slower ; only under the most favourable conditions did a small amount of I^{131} reach the root in 27 hr., and the amount absorbed was much less than in the bean. There was no upward movement of the I^{131} into untreated leaves of the oat.—Author's summary.

1557 MUIR, R. M. and HANSCH, C. **On the mechanism of action of growth regulators.** *Pl. Physiol.* 1953, **28,** No. 2, 218-32, bibl. 40, illus. [Dep. Bot., State Univ. and Dep. Chem., Pomona Coll., Claremont, Calif.]

The relative activities of 117 chemical compounds including derivatives of indoleacetic acid, phenoxyacetic acid, phenylacetic acid and benzoic acid have been determined on the basis of the molar concentration required to induce a minimal response in elongation of *Avena* coleoptiles compared with the molar concentration of indoleacetic acid inducing the same elongation. With such a measurement of relative activity only 4-chloro-3-indoleacetic acid is more active than indoleacetic acid (IAA). The same degree of activity as IAA is shown only by *a*-naphthaleneacetonitrile. The relative activity of naphthaleneacetic acid and 2,3,5-triiodobenzoic acid is half that of IAA, and 2,4-di-chlorophenoxyacetic acid and 2,4,5-trichlorophenoxyacetic acid have one fourth the activity of IAA. Recent hypotheses concerning the correlation of chemical structure with physiological activity of plant growth regulators have been examined as explanations for the activity or lack of activity of di-ortho alkyl substituted analogues and the low activity of mono-alkyl substituted analogues. It is concluded that the two-point ortho reaction mechanism affords the best working hypothesis although a few compounds at present do not seem to fit the hypothesis.—Authors' summary.

1558 Sande Bakhuyzen, H. L. van de. Kouderesistentie in verband met jarowisatie en harding ; vragen voor toekomstig onderzoek. [**Cold resistance in connexion with vernalization and hardening ; questions for future research.**] *Tech. Rep. 5. Cocobro Inst., Wageningen* 1952, 54-60, bibl. 12, French summary pp. 73-8.

1559† Vidal, A. A. Determinacion de acido oxalico en distintos periodos vegetativos de algunos especies forrajeras. [**Determination of oxalic acid at different stages of growth in various forage plants.**] *Rev. Fac. Agron., Eva Peron* 1952, **28,** No. 2a, 153-68, bibl. 37, English summary p. 166.

Barley, oats, rye, berseem (*Trifolium alexandrinum*), *Medicago hispida*, three species of *Vicia*, lupin (*Lupinus albus*) and lucerne were tested for content of oxalates at different stages of growth. The Leguminosae contained greater quantities of oxalates than the Gramineae. In all species, the content of soluble and insoluble oxalates, expressed as percentages of dry weight, increased as plant development progressed.—W.J.B.

1560† Ohlrogge, A. J. **The Purdue soil and plant tissue tests.** *Bull. 584. Purdue agric. Exp. Sta.* 1952, pp. 26, bibl. 6, illus.

A review is given of procedures recommended by the Purdue Agricultural Experiment Station for rapid estimations of the N, P and K status of soils and plants, and of soil acidity, together with notes on the preparation of the different reagents required for these tests.—P.J.B.

1561† Johnson, Betty R. and others. **Determinations of potassium in plant materials with a flame photometer.** *J. Ass. off. agric. Chem.* 1952, **35,** No. 4, 813-6, bibl. 5. [Michigan Agric. Exp. Sta., E. Lansing]

The K content of 13 different plant materials, as determined by flame photometric methods, agreed well with the values obtained by the use of the platinic chloride test.—P.J.B.

1562† Chang, Annie T. and Sherman, G. D. **The nickel content of some Hawaiian soils and plants and the relation of nickel to plant growth.** *Tech. Bull. 19. Univ. Hawaii agric. Exp. Sta.* 1953, pp. 25, bibl. 19, illus.

Data are given of the total exchangeable Ni content of the 10 major soil groups in Hawaii, together with the Ni content of grasses, legumes and other plant species growing on these soils.—P.J.B.

1563 Philipson, T. **Boron in plant and soil, with special regard to Swedish agriculture.** *Acta agric., Scand.* 1953, **3,** No. 2, 121-242, bibl. 79. [Gen. Inorgan. Chem. Inst., Roy. Agric. Coll., Uppsala, Sweden]

A review is given of certain chemical and geochemical aspects of boric acid and borates, together with an account of developments in procedures for assaying micro-quantities of boron, using curcumin as a reagent, which give an analytical error of about 1% when used for routine analyses. Notes are also given on the boron content of different Swedish soils, the mode in which boron is held in the soil, and the effect of Ca in the soil on the availability of boron to plants. Data are given on the boron content of a large number of samples of Swedish crops, grown both in normal farming practice and in manurial trials with boron. The crops include sugar-beet, fodder-beet, peas, oats, wheat, barley, flax, linseed, potatoes, rape (*Brassica napus* var. *oleifera*), white mustard (*Sinapis alba*), vetch (*Vicia sativa*) lupins and swedes. Boron-content values of plants at which deficiency symptoms may be expected are given for most of these crops, except the Gramineae, for which no lower limit of boron content was apparent. The Gramineae were shown to have a minimum boron requirement, but were able to utilize very scant supplies of boron in the field, making boron deficiency very rare in practice. The difficulties of using lower limits for boron content in vegetation as an index of the boron requirement of soils are noted. A detailed account is given of studies of boron deficiency in rape, white mustard and flax. Top-necrosis of flax was attributable to boron deficiency. The boron content of rain-water appeared to be of the same order as the boron content of the above-ground parts of the Gramineae.—P.J.B.

1564 Brown, J. C. and Hendricks, S. B. **Enzymatic activities as indications of copper and iron deficiencies in plants.** *Pl. Physiol.* 1952, **27,** No. 4, 651-60, bibl. 18, illus.

Relative activities of ascorbic acid oxidase, catalase, and peroxidase were measured at 2 or 3 periods of growth for one variety each of maize, wheat, and tobacco, three species of lupins, and 2 varieties of soyabeans grown on a soil of limited copper-supplying capacity, another of limited iron-supplying capacity, and 2 mixtures of these soils. Ascorbic acid oxidase activity is markedly reduced by limited copper supply and is correlated with a reduction in yield for wheat in which it is a terminal oxidase. Catalase was reduced in relative activity for corn, tobacco, the lupins and one variety of soyabean when the iron supply was limited. The activity of peroxidase was more constant. The hypothesis that if an element is limiting in the nutrition of a plant the deficiency will be evident in the changed activity of an enzyme among those requiring the element for function is in harmony with the results obtained.—Authors' summary.

1565 Hewitt, E. J. **Metal interrelationships in plant nutrition. 1. Effects of some metal toxicities on sugar beet, tomato, oat, potato, and marrowstem kale grown in sand culture.** *J. exp. Bot.* 1953, **4,** No. 10, 59-64, bibl. 12. [Univ. Bristol Res. Sta., Long Ashton]

1566 Vogler, E. La méthode du flétrissement. [**The wilting method.**] *Potasse* 1953, No. 205, 83-7, illus.

A description, based on the original work of Dr. Arland, is given of the wilting method as a means of determining the manurial requirements of crop plants.—M.A.

1567 Lenhard, G. von. Über die Versorgung der Nicht-Leguminosen mit Stickstoff aus der Atmosphäre. [**On the utilization by non-legumes of atmospheric nitrogen.**] *Z. PflErnähr. Düng.* 1953, **61,** No. 2, 130-46, bibl. 17. [Inst. PflErnähr. Bodenchem. Bodenbiol., Berlin-Dahlem, Techn. Univ., Berlin-Charlottenburg]

Certain non-legumes including sunflower (*Helianthus annuus*) and oats (*Avena sativa*) were grown in N-free water and NH_4-free air to determine whether they were capable of utilizing atmospheric N. No build-up of N in these plants under these conditions was recorded.—M.A.

1568 Koritz, Helen G. and Went, F. W. **The physiological action of smog on plants. 1. Initial growth and transpiration studies.** *Pl. Physiol.* 1953, **28,** No. 1, 50-62, bibl. 9, illus. [Calif. Inst. Technol., Pasadena]

The effect of synthetic smog (1-n-hexene plus ozone) on growth and transpiration of tomato plants and on elongation of etiolated pea sections has been studied. Growth of plants fumigated in the light at mid-day or early afternoon was significantly decreased by smog treatment.—From authors' summary.

MISCELLANEOUS

1569† Phillips, R. W. and others. **The organization of agricultural research in Europe.** *FAO Devel. Pap.* 1953, No. 29, pp. 66.

This publication is primarily intended to provide nformation on the organization of agricultural esearch in Europe for the guidance of relatively ess well-developed countries which are endeavourng to establish similar services themselves.—P.J.B.

570 Salamov, A. [**Selection work in the North Osetin State Breeding Station.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, **20,** No. 2, 19-24.

Maize is the primary crop in the area of this Station. Varieties suitable for North Osetin, Kabardinsk ASSR and the Groznensk Province are escribed. Winter wheat and beans (*Phaseolus* sp.) re also important crops. Information on grain ields obtained from different varieties in the North Osetin area is tabulated.—M.H.

1571† Brien, R. M. and Dingley, Joan M. **First supplement to " A revised list of plant diseases recorded in New Zealand " 1949-51.** *N. Z. J. Sci. Technol.* 1953, Sect. A. **34,** No. 6, 556-62, bibl. 17 [Dep. Sci. Industr. Res., Auckland, N. Z.]

In this supplement are listed 68 diseases of fungous, bacterial, and virus origin, on 98 host plants. It includes diseases and host plants recorded in publications since the preparation of " A Revised List of Plant Diseases Recorded in New Zealand " (Brien and Dingley, 1951) and additional host records. Fifteen of the diseases listed are recorded for the first time.—From introduction.

1572 Byrde, R. J. W. and others. **Studies on systemic fungicides. 3. The activity of certain chlorine-substituted β-naphthols and naphthyloxy-*n*-aliphatic carboxylic acids as systemic fungicides.** *Ann. appl. Biol.* 1953,

40, No. 1, 152-65, bibl. 9. [Univ. Bristol Res. Sta., Long Ashton]

A number of mono-, di- and trichloro-β-naphthols and the corresponding naphthyloxy-*n*-carboxylic acids were prepared. They were tested as systemic fungicides against chocolate spot of broad bean (*Vicia faba*) caused by *Botrytis fabae* and as fungicides *in vitro* by their effect on the germination of spores of *Sclerotinia laxa* and the growth of the mycelium of *Botrytis fabae*.—From authors' summary.

1573 Frans, R. E. and Aldrich, R. J. **Herbicidal comparisons between sodium arsenite and several experimental arsenical compounds.** *Proc. 7th N. E. Weed Contr. Conf. 1953* 17-22, bibl. 5.

In comparisons of 16 arsenical compounds with sodium arsenite, most of them did not differ significantly from sodium arsenite in respect of their herbicidal effect on rape and millet. It was considered that the herbicidal effect of arsenical compounds was more a function of the arsenic content of the spray solution than of the type of compound used. Monoethanolamine arsenite appeared to have the greatest herbicidal potentiality of the compounds used; it is relatively inexpensive to produce and is less toxic to humans than sodium arsenite. The addition of a wetting agent, or 2,4-D, markedly increased the herbicidal activity of monoethanolamine arsenite and sodium arsenite.—P.J.B.

1574 Vlitos, A. J. **Biological activation of sodium 2-(2,4-dichlorophenoxy) ethyl sulphate.** *Contr. Boyce Thompson Inst.* 1953, **17,** No. 2, 127-49, bibl. 25.

Studies are reported on the conversion of 2,4-dichlorophenoxyethyl sulphate in the soil to related compounds possessing herbicidal activity. Particular reference is made to the role of *Bacillus cereus* var. *mycoides* in this conversion.—P.J.B.

1575 Lange, W. H. and others. **Pest control by seed treatment.** *Calif. Agric.* 1953, **7,** No. 5, 7-8.

Recommendations are given for the use of Lindane in seed treatment for the control of damage caused by wireworm and seed corn maggot (*Hylemyia* spp.) attack on the germinating seed of a large number of field crops.—P.J.B.

1576 Flamini, S. Azione di prodotti antiparassitari sulla germinabilit à esull'energia germinativa di alcune sementi agrarie. [**Effect of insecticidal preparations on the germinability and germinating energy of some agricultural seed.**] *Ann. Fac. Agr., Perugia* 1950, **7,** 192-8, bibl. 1. [Received 1953] [Ist. Agron., Univ. Perugia, Italy]

Seeds of wheat, oat, bean [*Vicia faba*], chickpea [*Cicer arietinum*] and lentil [*Lens esculenta*] were stored for 90 and 180 days in contact with the following insecticidal dusts: Geigy 33 and Gesarol, based on DDT; Toxin p. and Tiogamma, based on Gammexane; and Caffaro dust, based on copper. The dusts had, in some cases, no effect on the germinability and germinating energy of the seeds, in other cases they had a stimulating effect, with the exception of Caffaro dust, which showed a depressing effect.—E.B.O.

1577† Simon, E. W. and Blackman, G. E. **Studies in the principles of phytotoxicity. 4. The effects of the degree of nitration on the toxicity of phenol and other substituted benzenes.** *J. exp. Bot.* 1953, **4,** No. 11, 235-50, bibl. 26, illus. [Agric. Res. Coun. Unit Exp. Agron., Dep. Agric., Oxford]

1578† Gilbert, N. E. G. **Referee sample investigations. Appendix A, 14th conference of Seed Analysts. 16th July,1952,** *J. nat. Inst. agric. Bot.* 1952, **6,** No. 2, 261-9. [Stat. Lab., Camb. Univ.]

Referee samples are those taken from a given seed bulk and sent to seed testing stations for analysis. The results obtained are then compared with those at Official Seed Testing Stations. The design and statistical analysis of a referee sample investigation conducted in Gt. Britain are described.—C.L.S.

1579† Vermeulen, F. H. B. **Control of the reproducibility and accuracy of routine analyses at the laboratory for soil and crop testing in the Netherlands.** *Pl. and Soil* 1953, **4,** No. 3, 267-75.

Among topics discussed are: control of reproducibility of analyses as judged by the standard deviation, agreement between the calculated standard error and the frequency distribution curve, the effect of shape of glassware used for extraction and the effect of season and casual occurrences on reproducibility of results.—P.J.B.

1580 Sahasrabudhe, V. B. **A statistical study of the factors affecting the efficiency of incomplete block designs.** *Indian Cott. Gr. Rev.* 1953, **7,** No. 2, 129-42. [Inst. Pl. Industry, Indore]

1581† van Bavel, C. H. M. **A drought criterion and its application in evaluating drought incidence and hazard.** *Agron. J.* 1953, **45,** No. 4, 167-72, bibl. 10. [N. C. Agric. Exp. Sta., Raleigh]

The proposed criterion for characterizing the incidence of drought is obtained by determining the number of days during the growing season during which soil-moisture tension exceeds a value known to cause a reduction in the growth of a given crop. A practical example of the use of this method for determining drought incidence relative to tobacco crops is given, using rainfall records collected over a 59-year period at Raleigh, N. Carolina. It is shown that the proposed criterion reflects differences in the moisture characteristics of different soils, the depth of rooting of given crops and their drought tolerance. The criterion is regarded as offering a rational method of judging whether the moisture supply in a given area is sufficient for a particular crop and, if not, how much supplemental irrigation is required. It is shown that drought-days, as defined in this criterion, occur at random and that a basic probability for their occurrence can be calculated.—P.J.B.

1582† QUASTEL, J. H. **'Krilium' and synthetic soil conditioners.** *Nature, Lond.* 1953, **171,** No. 4340, 7-10, bibl. 15. [Biochem. Dep., McGill Univ., Montreal]

BOOKS AND REPORTS

BOOKS

1583† AGRICULTURAL RESEARCH COUNCIL. **The Agricultural Research Service.** 1953, pp. 54, illus., London ; H.M. Stationery Office., 16 × 24 cm., 2s. 6d.

The scope of the work carried out by various State-aided institutions devoted to agricultural research in Great Britain is described. The institutes are classified according to the types of research which they undertake and lists of the scientific staff of each station are provided. A clear account is given of the work of the Agricultural Research Council, the nature of its supervision over the State-aided institutes and its relations with the Ministry of Agriculture and the university departments of agriculture.—W. J. Baulkwill.

1584 COMMONWEALTH ECONOMIC COMMITTEE. **Grain crops.** 1953, pp. 144, London ; H.M. Stationery Office, 25 × 18 cm., 5s.

Figures of world production and trade relating to wheat, wheat flour, maize, oats, barley, rye and rice are presented and discussed with special reference to British Commonwealth countries.—W. J. Baulkwill.

1585 WHYTE, R. O. and others. **FAO Agricultural Studies No. 21. Legumes in agriculture.** 1953, pp. xiii + 367, bibl. 126, illus., Rome ; FAO, 23 × 15 cm.

The awakening which is now taking place in lesser developed countries to the value of legumes in building soil fertility, improving animal husbandry and in better land use generally, makes this publication a timely one. In many countries, the steps leading to a widespread use of legumes in pasture improvement and as soiling, grazing, pulse and conservation crops, are difficult. Not only is he search for suitable types involved, but there is also the problem of their integration in remunerative cropping systems. The latter is often the greater task in view of the frequent lack of trained personnel for extension work, the problems of land fragmentation, insecurity of tenure and the conservatism, poverty and ignorance of peasantry working on traditional lines.

This publication will be of great value in development programmes and the authors, whose wide experience and reputation are so well known, are admirably suited to their task. It should not be understood, however, that this book will be of value only in backward countries. The authors claim that this is not a text-book on legumes but a statement of the present position ; consequently many chapters raise questions rather than state facts and it will therefore be found stimulating to all workers in this field and that of general agronomy.

Part I is divided into 13 chapters covering subjects such as the economic botany of legumes ; plant introduction, testing, growing and use ; soil and climatic relationships ; poisonous plants and weeds, and seed production. In addition, one chapter is devoted to answers to a questionnaire circulated by F.A.O. to tropical and sub-tropical countries which show their respective stages of development.

The initial problem of plant introduction is well discussed. In the past, interchange of material has often depended on personal contact. This has obvious disadvantages, particularly when many of the centres of origin of cultivated species are found in areas where personnel and facilities are limited. Further, the basis for exchange is often made on that of major climatic similarity which may ignore the possibilities of types from widely different climates on the one hand and the significantly different changes which can occur within small areas on the other. As is recommended, an extension of such collecting expeditions as that made by Australian workers in 1951 would be well worth while. Organizations such as the Mediterranean Pasture and Fodder Development Working Party convened by F.A.O. can also assist greatly in this respect.

At a later stage, provision of seed in commercial quantities is a frequent problem, and, while seed production techniques could hardly be covered at length in such a publication, there are useful descriptions of some seed production schemes. In this connexion, seed-growing in areas with suitable conditions, for use in other areas where production is hazardous—such as the Mediterranean for N.W. Europe—is discussed.

The chapter on symbiotic fixation of nitrogen—provided by Mr. J. R. Harris—is particularly interesting. It emphasizes the importance of availability of suitable *Rhizobium* species, particularly when the testing of new types of legumes is contemplated. This may well lead to second thoughts in many minds about conclusions made on some species without adequate consideration of this factor.

Part II gives an extensive and valuable alphabetical list of genera and information on a large number of species. This is followed by a well-planned chart listing almost 200 species with information on some plant characters, adaptation to soil and climate, utilization and seeding requirements.

The numerous charts and tables in the text, derived from many sources, are interesting both in content and lay-out and the photographs well-chosen and reproduced. Printing errors are rare, but it is difficult to know what is meant by *D. bulbosus* and *L. albus* on pp. 192 and 193 respectively.

Paper quality and print are good and quite at variance with the binding which, in a book which will surely receive much handling, should have been more adequate. The bibliography has been purposely limited but is interesting. The absence of an index is very regrettable.—D. K. Jones.

1586 BALLS, W. L. **The yields of a crop : based on an analysis of cotton growing by irrigation in Egypt.** 1953, pp. xv + 144, illus., London ; F. N. Spon, Ltd., 22 × 14 cm., 21s.

In this book Dr. Balls who, as he says in his Introduction, has " known four-and-forty generations of cotton plants in Egypt rather intimately", presents a summary of much of his experimental experience on the ecology of the crop. Though much of it is based on material already published, the summary is not less welcome since a great deal of this information is not readily available outside Egypt.

In spite of the generalized title, the book is essentially a study of a single species of cotton in the very peculiar environment of Egypt and so is of more concern to growers of Egyptian cotton than to cotton-growers in general. Considerable concentration will be needed by those who know nothing of the Nile Valley, or of the cotton crop, to follow the data given. Like other books by Dr. Balls, this one is tough reading ; the sometime tortuous or ambiguous style, the preference for long words, and the occasional unhappy choice of metaphors tend to obscure the meaning. This applies not only to the technical, but to the general discussion of the problems. The meaning of such a sentence as " Success in translating knowledge into power is dependent on invisible action making use of self-interest " (p. 118) is not plain, and there were many others which puzzled the reviewer to construe. The numerous diagrams are intended to make understanding easier ; in fact the author remarks that his " text is little more than an interleaving between the diagrams." But, unfortunately, a large proportion of the diagrams, many of which show "time-contours" of plant development or " isophytic lines", require as much concentration for their understanding as does the text. However, the reader who perseveres—and all who are interested in the future of Egyptian agriculture must do so—will be rewarded by access to the store of Dr. Balls' vast experience. While many aspects of plant development are discussed, there is a continuous theme running through the book, and it is a pessimistic one. It is that continued irrigation, and especially the modern "perennial" irrigation, is producing a rising water-table in the Egyptian Delta which threatens, basically, the productivity of the soil for cotton. [See Abs. 1504.] It is indisputable that cotton yields in the Delta in modern times have not equalled those obtained in the eighteen-nineties, though in recent years they have climbed to higher levels than those of the nineteen-twenties. Dr. Balls' contention is that these recent increases, due to more fertilizers, better husbandry, and better varieties, only mask what he regards as a steady fall in the basic factors of soil fertility. On the Giza Experimental Farm, the level of the water-table in the soil in summer has risen from about 4.0 m. in 1900 to 1.7m. in 1950 (p. 70). The argument works up to a climax in the diagram presented on p. 105, in which the attempt has been made to reconstruct " basic" yields freed from the annual incidence of insect pests and the effects of fertilizers and new varieties, and to show how these " basic" yields have tended to fall over the years. In the course of the argument, many side-lines of interest to the crop ecologist are explored, especially the interactions between the rising water-table and the use of fertilizers, new varieties, and spacing, to meet these changing conditions. But these are incidental.

It will perhaps prove to be the latest and greatest service of Dr. Balls to Egyptian cotton-growing that he has so clearly shown the red light about the rising water-table. It is a problem that always threatens irrigated lands ; in his last few pages Dr. Balls suggests, only in general terms, that it must be dealt with by a reformation of the rrigation and drainage system at great expense. He does not appear optimistic that Egypt will ndertake this work, but it acquires a new urgency vith the potentially greater water supplies to be nade available in Egypt by " century storage" in he Nile valley.—G. B. Masefield.

1587 Irvine, F. R. **A text-book of West African agriculture, soils and crops.** 2nd edn. 1953, pp. x + 367, bibl. 44, illus. 32, London ; Geoffrey Cumberlege, Oxford Univ. Press, 19 × 12 cm., 14s.

he appearance of a 2nd edition of this useful text-ook will be welcomed by students and teachers f agriculture both in West Africa and in other ropical countries. The descriptions of the most mportant field crops and of native cultivation ractices are presented both simply and ade-uately. Although the fundamentals of soil con-ervation and land usage are described, it is a pity hat no reference is made to specific anti-erosion orks in the Northern Territories of the Gold Coast r to land settlement schemes in Nigeria. In an ddendum, recent work and developments in griculture since the appearance of the 1st edition 1934 are described and additional information n many local crops is given. The book contains a seful bibliography but the quality and selection some of the illustrations might be better. Some lace names are misspelt according to modern sage.—C. L. Skidmore.

588 Wolfe, T. K. and Kipps, M. S. **Production of field crops. A textbook of agronomy.** 4th edn. 1953, pp. xvi + 495, bibl. at end of each chap., illus., London ; McGraw-Hill Publ. Co., Ltd., 23 × 15 cm., 52s.

his book is an up-to-date edition of a work first ublished in 1924. As a textbook of North American ronomy it forms an excellent basis for an ele-entary course on field-crop production in the nited States. In addition, however, the ground vered includes basic principles which are equally levant to the student, teacher, farmer and viser wherever they may be.

The book is divided into nine sections. Section -occupying almost half of the 477 pages of text— a general one of 19 chapters covering the prin-les underlying the production of crops. The nomics of crop production, general botanical scriptions of crops, and plant improvement are cussed in this section, together with the more actical topics of preparation of the seed-bed, the of good seed, storage of grain, grassland farm-, weeds, and crop rotations. The other seven tions are devoted to a more detailed practical tline of individual crops. The more important ps [importance being judged by the acreages wn in the USA] are each given one chapter, and they are classified into seven sections according to their agronomic use. Section II is devoted to a consideration of grain crops with maize, wheat, oats, barley, rye and rice, each being dealt with in detail. Section III describes the legumes grown for seed ; Section IV, forage crops ; Section V, root crops ; Section VI, fibre crops ; Section VII, tubers ; and Section VIII, sugar plants. The last of the 38 chapters in the book, Section IX, is devoted to the tobacco crop.

One must congratulate the authors on the way they have managed to keep abreast of the times. It is difficult to keep pace with any subject developing as rapidly as is modern agricultural method, yet the most recent researches in certain subjects, e.g. farm machinery and herbicides, are dealt with adequately. Each chapter has its own comprehensive list of references, though the general usefulness of these might have been increased if they had included more contributions from workers outside the United States. Of particular value to the student are the ' Topics for Discussion' at the end of each chapter—topics which help him to think around his subject. This publication is recommended to all interested in field crops as a very readable reference book, particularly in its presentation of the principles of crop improvement.—A. Lazenby.

1589† Norman, A. G. (Ed.) **Advances in agronomy.** 1952, Vol. 4, pp. xi. + 416, New York ; Academic Press Inc., 23 × 14 cm., $8.50.

[For earlier issues in this series see *Herb. Abstr.* 23 : 649 ; 22 : 323, 324.] Attention is drawn to the following extract from the editor's preface : " It is the policy of this series to include various types of articles of a review or progress report nature, the test for inclusion being whether they are likely to be of interest and assistance to a substantial group of the profession. Some papers may go beyond what is normally considered agronomy ; indeed two such are to be found in this volume. Some will be more " specialized" than others, but it must be recognized that the definition of what constitutes a specialized article may well depend on the personal interests of the reader." This 4th volume contains : Grassland agronomy in Australia, by H. C. Trumble ; Type of soil colloid and the mineral nutrition of plants, by A. Mehlich and N. T. Coleman ; The physiological basis of variation in yield, by D. J. Watson ; Copper in nutrition, by F. A. Gilbert ; Ecological and physiological factors in compounding forage seed mixtures, by R. E. Blaser, W. H. Skrdla, and T. H. Taylor ; Soil manganese in relation to plant growth, by E. G. Mulder and F. C. Gerretsen ; Atomic energy and the plant sciences, by N. E. Tolbert and P. B. Pearson ; Vegetation control on industrial lands, by K. C. Barrons ; Soil and the growth of forests, by T. S. Coile.—M. Hall.

1590 Pakistan Government. Co-operation and Marketing Adviser. **Crop wealth of Pakistan.** 1952, pp. 287, bibl. 13, illus., Karachi ; Manager of Publications, 16 × 25 cm., 3 rupees. [Received 1953]

Details are given of the total and regional production of food grains, pulses, oilseeds and fibre crops in Pakistan. There are notes on the methods of cultivation and the marketing arrangements associated with each crop.—W. J. Baulkwill.

1591† Frear, D. E. H. **Pesticide handbook, 1953.** 1952, pp. 204, Pennsylvania ; College Science Publishers, 23 × 15 cm., $1.25.

This is an enlarged edition of the 1952 Handbook and contains over 5000 named commercial products. An additional section contains a list of the professional pest control operators in the different States of the USA. [See also *Fld Crop Abstr*. 5: 1380.]—P. J. Boyle.

REPORTS

The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated.

1592 **Great Britain.** University of Reading. National Institute for Research in Dairying, Report for 1952. Reading, 1953, pp. 123.

1. Fodder roots, pp. 31-2. A comparison between yields of Yellow Globe mangel, Barres Øtofte, Red Øtofte X and Pajbjerg Rex X at two levels of nitrogenous dressing showed that the fodder sugar-beets outyielded Yellow Globe mangel.
2. Fodder-beet fertilizer trial, p. 32. A trial was carried out in 1951, using the variety Pajbjerg Rex X, with varying combinations of muriate of potash and ammonium sulphate (three times of application). N gave an increase of tops but depressed the dry-matter content of the roots. Application of N at sowing times produced higher yields than did later or split applications.
3. Kale and cabbage, p. 32. In the 1951-2 season a fourth and final comparison was made of yield and composition of marrow-stem kale, thousand-head kale and cattle cabbage with, and without, a top-dressing of 6 cwt./ac. ammonium sulphate. Marrow-stem kale outyielded the other two crops. —M.A.

1593 **Great Britain.** Colonial Development Corporation. Annual Report and statement of accounts for year to 31 December, 1952. London, 1953, pp. 62, maps 2.

At the end of 1952 there were 57 operational undertakings—an increase of 2 on 1951. In the Gambia, the Yundum Farm was started and plots of experimental crops planted. The Gambia Rice Farm was abandoned. The Corporation approved a loan to finance the expansion of rice production in British Guiana. Brief progress reports are given for each of the 82 projects with which the Corporation was concerned during the year.—C.L.S.

1594 Hayward, P. R. Fourth Annual Report on trial and experimental work carried out at Throws, Little Dunmow, 1951-52. [n.d.], Hasler and Co., Ltd., pp. 54. [Received 1953]

[See *Fld Crop Abstr*. 6 : 426.]

Investigations reported :

1. Trials with old and new varieties of winter wheat, pp. 4-9. A full range of winter-wheat varieties was again included in trial plots during the year and many new varieties of French origin were tested.
2. Trials with 8 varieties of spring barley, pp. 9-10. The variety Herta gave a significantly increased yield compared with Earl ; as did the varieties Herta, Freja and Carlsberg compared with Plumage Archer.
3. Spring observation plots for comparison of straw length and stiffness in oats, pp. 11-14. Milford or S.225 were considered the shortest and stiffest-strawed spring oat variety available, but where a good-standing variety is required on land of high fertility and yield of straw is important, the varieties Sun II and Abed Minor show an improvement upon varieties now grown. The new French variety Bellone compared very favourably with Sun II in straw-length and stiffness.
4. Field peas, varietal trial, pp. 12-14. Of the varieties tested, Minerva Maple gave higher seed yields than Essex White, Marathon Maple, Harrison Glory or Dun (Australian seed).
5. Winter beans, yield trials, pp. 15-20. Re-selected stocks S/4/49/LS/51, S/3/49/LW/51 and S/2/47/ESL/51 gave highly significant increases in yields compared with the control, Special No. 11.—M.A.

1595 **Scotland** Department of Agriculture. Report for 1952. Edinburgh, 1953, pp. 96, illus.

There are 16 sections in this report which includes information on : land utilization ; land tenure and land improvement (Hill Lands Commission, bracken control, fertilizer subsidies) ; crop improvement (seed testing, plant registration, certification schemes) ; and pest control.—M.A.

1596 **Austria.** Alpine Agricultural Research Station. Bericht über die Arbeitstagung 1952 der Arbeitsgemeinschaft der Saatzuchtleiter. [Proceedings of the 1952 convention of the Seed Growers' Association.] Admont, 1952, pp. 227.

mong the papers read at this meeting were the ollowing :

. The use of U.S. hybrid maize varieties in ustrian agriculture. By A. Buchinger, pp. 8-20.

. A review of the results of vernalization experinents and their application to crop production, eed production and plant breeding. By H. Haensel, p. 66-120.

. A review of the methods used in assessing uality of different wheats. By H. Fuchs, pp. 121-3.

Control of cereal diseases. By F. Pichler, p. 134-42.

Results of 1951 cereal trials. By F. Pammer, p. 143-5. [See Abs. 1323.]

Results of 1951 potato trials. By Johanna emel, pp. 147-54. [See Abs. 1411.]

Cutting and size of seed potatoes. By Gertrud aehnl, pp. 155-9 [See Abs. 1405, 1413.]

. Arrangement and evaluation of experimental esults. By F. Pammer, pp. 160-72.

. Different ways of evaluating results from xperiments laid down on the elongated plot attern. By A. Graf, pp. 173-94.

0. Some experimental arrangements explained ith the help of an analysis of variance. By ertrud Jaehnl, pp. 195-206.

1. Limits of modern experimental technique. By . Zeller, pp. 207-16.—M.A.

597 **Switzerland.** Federal Experiment Station, Zürich-Oerlikon. Bericht über die Tätigkeit pro 1950/51. [Report of the activities for 1950/51.] *Landw. Jahrb. Schweiz* 1953, **1,** 1-72. [Received 1953]

NVESTIGATIONS REPORTED :

Seed testing. By E. Frey, pp. 19-36. About 3,000 seed samples of legumes, grasses, root crops nd cereals were tested for purity and germination apacity. Results are tabulated.

. Trials with fodder grain. By M. Buchli, pp. 48-0. Of the summer barleys tested, the variety erta gave the highest yield. The winterhardiness f English varieties of winter oats, S 147 and S 172, as yet to be proved conclusively.

Truck crops. By E. Keller, pp. 50-2. 41 new arieties of foreign potatoes were tested. Work cluded a weekly count of aphid populations in 9 localities. In collaboration with the Instituut oor Plantenziektenkundig Onderzoek, Wagengen an investigation into the damage caused by eating imported potatoes with growth-inhibiting bstances was started.

. Special crops. By M. Buchli, p. 53. Experiments ere continued on the resistance to pod shattering different varieties of rape.

Fungicides. By H. Zogg pp. 57-60. Spraying otato haulms with 2% Bordeaux mixture gave e best results in controlling *Phytophthora instans.* The same strength was also the most effective in controlling Cercospora in sugar-beet. Figures are given showing the effect of fungicides in the control of *Tilletia tritici* in wheat.

6. Insecticides and preparations for control of other pests. By E. Horber, pp. 60-7. Figures are given of the results of experiments for control of cockchafer, wireworm and potato aphids.

7. Special investigations of plant diseases. By H. Zogg, p. 67.

8. Pest control. By E. Horber, pp. 68-72. An account of field trials carried out against the May cockchafer, and a report of the effect of insecticides on the flavour of potatoes are given.—M.A.

1598 **Switzerland.** Swiss Association for the Testing and Distribution of Seed Potatoes. Seizième rapport d'activité. [6th progress report, 1 July, 1951 to 30 June, 1952.] Brougge, 1952, pp. 56.

The results of potato experimental work carried out during 1951 at schools of agriculture, at the Federal experimental farms at Mont-Calme and Zürich-Oerlikon, and at other centres, are given. Tables show : incidence of disease, vegetation stages, yield, size of tubers, dry matter and starch contents, condition of tubers, degree of blackening after cooking and an assessment of the morphology of the tubers from different varieties.—M.A.

1599 **Canada** Department of Agriculture. Report of the Director of Science Service for the year ended March 31. 1952. 1953, pp. 51.

INVESTIGATIONS REPORTED :

1. Wheat, pp. 14-16. Chinook, a new variety, is almost as resistant to wheat stem sawfly as Rescue and equal to Marquis in quality. Studies on *Helminthosporium sativum* showed that most of the natural inoculum of this fungus was present on the soil surface and that burying it by ploughing could reduce the incidence of the disease.

2. Potatoes, pp. 18-20. Trials to control late blight [*Phytophthora infestans*] showed that Bordeaux mixture was most effective, followed, in order, by Dithane D-14, Cop-O-Zink, SR-406, and Crag 658.

3. Sugar-beet, p. 21. Where sugar-beet nematode control is carried out, it is recommended that the crop be grown for 3 years in succession after treatment. Yields are reduced during the first year, but rise during the 2nd and 3rd years.—P.J.B.

1600 **Canada.** Eastern Section National Weed Committee. Proceedings of the Fifth Meeting, 1951, 1952, pp. 140.

Among the papers presented at this meeting were the following :

1. History and development of CMU. By G. L. McCall, pp. 26-8.

2. Progress report with CMU weedkiller on railway right-of-way (ballasted section). By G. R.

Snyder, pp. 29-31. Excellent control of all grassy weeds was obtained by applying 40-80 lb. CMU per ac. Spring treatments were the most effective.
3. The effect of CMU on couch grass [*Agropyron repens*]. By G. Knowles, p. 36. Applications of 20, 40, 80 and 100 lb. CMU per ac. made to couch grass sod on 5 May gave complete control within 2 months at all rates of treatment.
4. The effect of CMU on deep-rooted perennials. By G. Knowles, p. 37. Applications of 40 and 80 lb. CMU per ac. completely controlled *Rumex crispus*, *Cichorium intybus*, *Sonchus arvensis* *Silene cucubalus*, *Linaria vulgaris* and *Convolvulus arvensis*. Applications of 20 lb. CMU per ac. gave almost complete control of all species, except *Convolvulus* spp.
5. Observations of the effect of CMU on couch grass [*Agropyron repens*]. By M. R. Wiancko, pp. 38. Applications of 20 and 40 lb. CMU per ac. to couch grass sod gave 70 and 93% control of this weed, respectively.
6. CMU experiments at Fredericton. By W. B. Collins and C. F. Everett, pp. 39-40. [See Abs. 1531.]
7. History, development and summary of experimentation with calcium cyanamide. By A. T. Sinclair, pp. 44-8.
8. Sodium TCA, dinitros and low-volatile esters of 2,4-D and 2,4,5-T. By J. S. Wilson, pp. 62-4. Brief notes are given on these types of herbicides, together with possible developments in their use in the future.
9. Maleic hydrazide and other chemicals for the control of wild oats [*Avena fatua*] in cereals. By J. C. R. Warren and D. R. Bronson, pp. 67-72. Among a number of herbicides, maleic hydrazide showed most promise for wild oat control in cereals. The following method of treatment is suggested: delay sowing the cereal in order to allow the wild oats to emerge, then spray with 2 or 4 lb. maleic hydrazide per ac. before the cereal crop emerges. There was no evidence of any residual action following maleic hydrazide applications.
10. Preliminary report on the life history of yellow rocket (*Barbarea vulgaris*). By D. R. Lindsay and I. J. Bassett, pp. 73-5.
11. Biological control of weeds in Canada. By J. M. Smith, pp. 95-7. Notes are given on the control of St. John's wort (*Hypericum perforatum*) by releases of *Chrysolina gemellata* and *C. hyperici*.
12. Weed control in soyabeans by tillage and cropping practices. By G. P. McRostie, pp. 102-7. Studies in Ontario showed that harrows could be used for weed control until the soyabeans were 6-8 in. high and that weeders and rotary hoes could be used until the crop was 8-10 in. high. Row spacings of 21-24 in. were best in terms of seed yield and for making weed control by tillage possible. The report of the Herbicide and Weed Classification Committee gives summarized recommendations for weed control in different field crops, together with a classification of annual, biennia perennial and woody weed species according t their susceptibility to 2,4-D.—P.J.B.

1601 **United States and Canada.** Proceedings of th Joint Meeting of the 9th Annual Nort Central Weed Control Conference and th 6th Annual Western Canadian Weed Con trol Conference, 1952. 1952, pp. 126.

INVESTIGATIONS REPORTED:
1. Effects of herbicides on cereals, with specia reference to oats. By P. J. Olson, pp. 2-4. Notes ar given on damage to wheat, barley and oats, cause by herbicidal treatment at different growth stages
2. Effects of herbicides on linseed. By R. S Dunham, pp. 4-5. Notes are given on the effect o 2,4-D, MCPA and TCA on linseed.
3. New aspects of weed control in flax. By W. H Silversides, pp. 5-6. [See Abs. 1481.]
4. Physiological aspects of micronutrient spray and dusts. By D. J. Wort, pp. 6-8. [See Abs. 1332.
5. 2,4-D with additives of leaf-feeding properties By P. O. Ripley, pp. 8-11. Reports are given o trials on the use of 2,4-D and 2,4-D fortified wit commercial micronutrient dusts [composition no stated] for weed control in wheat, oats, barley an flax. There was no evidence that fortified 2,4-I dusts were superior to standard 2,4-D treatment in terms of crop yields.
6. New aspects of weed control in flax in th United States. By W. P. MacDonald, pp. 11-12 Notes are given on recent developments in the us of MCPA, 2,4-D, TCA, CMU, IPC, PCP and dinitr materials. 4 and 8 lb. per ac. of CMU applied as pre-emergence spray treatment to flax has give good control of wild oats (*Avena fatua*).
7. Taxonomic investigations on wild oats. By D R. Lindsay, pp. 20-2. [See Abs. 1121.]
8. Wild oats—cultural control. By D. A. Brown pp. 22-3. Notes are given on tillage methods an cropping systems for controlling wild oats i Canada.
9. Chemical control of wild oats. By H. W Leggett, pp. 23-5. Notes are given on curren developments in the use of herbicides for control o wild oats in Canada.
10. Penetration and translocation of 2,4-D compounds. By E. W. Hauser and D. W. Young pp. 27-31. [See Abs. 1127.]
11. Translocations of herbicides in leafy spurge By C. M. Switzer and R. O. Bibbey, p. 32. Note are given on the effect of different 2,4-D an maleic hydrazide treatments, used in an attemp to kill the crowns of leafy spurge (*Euphorbia esula*)
12. The effect of 2,4-D on plant enzymes. By D. J Wort. A review is given: (a) to suggest ways i which enzyme activities in plants may be altere by 2,4-D treatments, and (b) to list the reporte effects of 2,4-D on specific enzymes and enzym systems in different plants.

l3. Respiration response of wheat root-tips to ,4-D, maleic hydrazide and indole acetic acid. 3y S. Zalik and G. A. Gries, p. 36.

.4. Chemical weed control in peas. By J. C. M. 'Arrivee, pp. 68-9. In trials in Manitoba, MCPA, inox, KCNO and $NaHCN_2$ were compared as erbicides for weed control in peas. MCPA (Na alt) at 0.25 lb. per ac. as a post-emergence spray, r at 1 lb. per ac. as a pre-emergence spray, gave ood control of most broad-leaved, annual weeds nd was superior to the other trial materials.

5. Control of wild oats and volunteer grain in ugar-beet with IPC. By R. T. Nelson, pp. 73-5.

6. Control of weeds in canning peas with MCP. y K. P. Buchholz, pp. 75-6. Trials in Wisconsin howed that peas were most tolerant to MCPA hen 6 in. high and that rates of 0.25 lb. per ac. f MCPA were the highest that could be depended n not to cause noticeable yield reductions.

7. Physiological studies on the behaviour of TCA vegetable crops and soils. By T. W. Tibbitts and C. Holm, pp. 76-7. Notes are given on the ehaviour of TCA in pea and bean plants.

8. Chemical weed control studies with sugar-eet. By E. T. Andersen, p. 77. [See Abs. 1009.]

). Reports on ClIPC, octachlorocyclohexanone, ne methyl, ethyl and isopropyl esters of tri-lorobenzoic acid, sodium 2,4-dichlorophen-xyethyl sulphate (SES), 2,4-dichlorophenoxyethyl nzoate (SESIN), maleic hydrazide and N-1 aphthylphthalamic acid, pp. 98-100.

). Review of work with CMU as a herbicide. By J. Willard, pp. 101-2.

. Other new herbicidal materials. By W. C. utton, p. 102. Notes are given on β-naphthoxy-etic acid, 4-chlorophenoxyacetic acid, tri-loracrylate and sodium isopropyl xanthate.

. Recommendations of the Research Committee, C.W.C.C., pp. 103-11. A review is given of the sults of work done in 1952 on the control of rennial weeds, including *Agropyron repens*, *rghum halepense*, *Convolvulus arvensis*, *Euphorbia ula*, *Cirsium arvense*, *Sonchus arvensis*, *Lepidium p.*, *Linaria vulgaris* and *Centaurea repens* ; on l sterilants and on the control of weeds in field ops.—P.J.B.

02 **United States** Department of Agriculture. Office of Experiment Stations. Report on Agricultural Experiment Stations, 1952. 1953, p. 150.

nong the results of research work reported are e following :

1 Once-over tillage for seed-bed preparation, 5. Trials in Michigan showed that ploughing, ht soil-conditioning and sowing conducted as e combined operation resulted in cereal yields high as those where conventional seed-bed pre-ration was carried out.

2. Maize, pp. 16-17. Notes are given on outstanding new hybrid varieties.

3. Wheat, pp. 19-22. Notes are given on new varieties, including Ponca, Apache, Sioux and Anderson, and on crosses between wheat and *Agropyron* spp., all of which are resistant to wheat joint worm [*Harmolita* spp.].

4. Barley, p. 20. Notes are given on the new varieties Kenbar, Hudson, Goliad, Kearney and Dicktoo.

5. Groundnuts, pp. 22-3. The best germination was obtained from groundnut seed cured at harvest to 6% moisture content, with not more than 2% damaged seed, stored in the shell at temperatures under 35°C. Trials in Georgia showed that exposure of groundnut pods to direct sunlight for more than 2 days impaired the germination of the seed ; to prevent this, seed curing in the windrow is becoming more prevalent.

6. Soyabeans, p. 23. The Improved Pelican variety bred in Louisiana is adapted to the sugar-cane zone where heavy growth for hay, or soil improvement, is required. Its seed yields average 30 bu. per ac. Its growth is vine-like.

7. Potatoes, pp. 23-4. A note is given on the variety Knick, produced by the Alaska Station. Trials in New York State showed that one pre-emergence application of dinitro-type herbicide about 2 weeks after sowing gave good weed control without damaging the crop.

8. Sweet potatoes, pp. 24-5. Onolena is a new variety with a high dextrin content developed at the Hawaii Station. It has outyielded most of the standard varieties and stores very well.—P.J.B.

1603 **French Sudan.** Service Agricole. Notes sur l'agriculture au Soudan. [Notes on agriculture in the (French) Sudan.] *Agron. trop., Nogent* 1952, **7**, No. 4, 396-406, illus., maps.

This is an excerpt from the annual reports of the Service Agricole du Soudan Français.—E.B.O.

1604 **Nigeria** Department of Agriculture. Annual Report for the year 1950-51. Lagos, 1953, pp. 123.

INVESTIGATIONS REPORTED :

1. An experiment at Gusau showed that priming (stripping off the leaves and side-shoots) of rama (*Hibiscus cannabinus*) gave a fibre yield of 66.5% on stripped bark, against 54.5% for unprimed, p. 27.

2. Groundnut selection and variety trials, pp. 36-8,

3. Soyabean variety trial, p. 38. Benares yielded more than Avoyelles, Mamloxi and Acadian.

4. Sunflower variety trial, p. 38. Saturn yielded higher than Grey seeded, Hungarian and Sunrise.

5. Manurial trials, pp. 39-42. Random dropping of seed and superphosphate granules led to a reduction in germination though not in yields of groundnuts, while yields of Guinea corn increased.

At Samaru, small superphosphate granules were as effective as pellets and oversized granules. By splitting superphosphate into its two constituents, monocalcium phosphate and calcium phosphate, it was shown that the phosphate was important for the development of the kernels while gypsum was required for the growth of the haulm. At Kano the residual effect of superphosphate applied to sorghum in 1947 gave increased yields of groundnuts in 1950.
6. Experimental unit farms, pp. 57-8.
7. Cassava varietal trials, p. 78.
8. Cowpeas and maize interplanting trial, p. 78. Yield of maize was not affected by the yield of inter-cropped cowpeas.
9. Rotation experiments, pp. 80-1. General responses to application of ammonium sulphate were recorded in increased yields of yams and applications of phosphate increased yields of maize severely affected by stem-borer attack.
10. Soil fertility, p. 91. Experiments carried out in the Eastern Provinces have shown clearly that increased crop yields can be obtained by the use of lime, artificial fertilizers and, in the acid sandy soils, *Acioa barteri* as a bush-fallow crop.
11. Linseed, p. 95. Early planting in September is recommended for the varieties Canadian Royal and the Nughen strains at Bambui farm.
12. Potatoes, p. 95. At Bamenda, Bliss Triumph was considered the best of the varieties tested.—M.A.

1605 **Northern Rhodesia** Department of Agriculture. Annual Report for the year 1952. Lusaka, 1953, pp. 27, 1s.

INVESTIGATIONS REPORTED :
1. Fertilizer trials on maize and groundnuts, pp. 17-20.
2. Time of planting, spacing and interplanting trials on cotton, p. 18. Early planting of cotton gave the highest yields. Groundnuts interplanted in cotton reduced the yield of cotton slightly but resulted in a greater cash return from both crops than from cotton grown alone.
3. Rice variety trials, p. 18. In a trial of 12 varieties of rice at Petauke, 2 varieties, B.C. 70 and Afaa Mwanza proved most promising from the point of view of early maturity and quality and yielded at the rate of 4000 lb. and 3000 lb. of paddy per acre, respectively. Both matured in 150 days, or almost a month earlier than the standard local variety, Faya.
4. Southern Rhodesian Double Hybrid maize outyielded Hickory King, p. 19.
5. Cowpea variety trial, p. 19.—M.A.

1606 **Nyasaland Protectorate** Department of Agriculture. Annual Report for the year 1951. Pt. II. Experimental Work. Zomba. 1953, pp. 40, 5s.

INVESTIGATIONS REPORTED :
1. Maize variety trials, p. 4. Three Souther Rhodesian hybrids outyielded all other varieti but they suffered from the disadvantage that th cobs were not well covered and that the grain wa soft, leading to heavy weevil infestation in stor
2. Groundnut spacing trials, p. 7. The value close planting at 6 in. between rows and of sowi 2 seeds per hole was demonstrated.
3. Cotton. Experiments at Makanga, p. 12. Earl inter-planting of cotton and early harvesting interplanted maize resulted in the cotton cro being harvested appreciably earlier than usual.
4. Maize/cotton interaction experiment, pp. 12-1. The results showed that (1) early-sown maiz gave higher yields than late-sown maize, (very wide (9 ft.) inter-row spacing depressed maiz yields, (3) early sowing of interplanted cotto tended to depress maize yields, (4) early stookin appeared to depress maize yields, (5) early-sow cotton bore well even when interplanted wit vigorous maize, (6) Early harvesting of the maiz did not appear to affect the yield of interplante cotton.
5. Empire Cotton Growing Corporation, pp. 14-1 Results of the 1950-1 variety trial are given. Bot Karonga CLB and Ngabu CLB gave higher li yields per acre than CL20. In a two-level manurial trial, with dressings of 100 lb. and 200 l per acre ammonium sulphate on Karonga CL higher yields were proportional to increased dosage.—M.A.

1607 **India**. Board of Agriculture and Anim Husbandry. Crops and Soils Wing. Pr ceedings of the Eighth Meeting 1950. Delh 1952, p. 307. [Received 1953]

SUBJECTS DISCUSSED :
1. Measures to be adopted for increasing foo production by the use of root crops, pp. 54-81. Th high yields of dry-matter from potatoes, swe potatoes, eddoes (*Colocasia* sp.) and yams (*Di scorea* sp.) are compared with the relatively lo yields of dry matter obtained from wheat and ric Measures for the extension of the cultivation root crops in different provinces are outline *Coleus parviflorus* (pp. 73-5) is suggested as a roo crop which could be grown in many parts of Indi and the methods by which it can be propagate planted and harvested are described.
2. The causes of low yields from food crops i India, compared with other countries, pp. 81-14 The average yields of various crops are compare with those in other countries. The average yiel of paddy is 4220 kg. per ha. in Spain, but onl 1230 kg. per ha. in India. In India, lack of wat and shortage of manures are held to be the mai limiting factors in crop production. It is suggeste that under certain tropical conditions gre manures may have little beneficial effect on th

il and that, under such conditions, farmers ould concentrate on the use of inorganic fer-lizers (p. 87). One reason for the low yields btained from potato crops is the small size of seed sed and the sapping of the vitality of the tubers y the repeated removal of the sprouts made ecessary by the warm climate (p. 93). Large seed ould be kept in good condition at cold storage entres. It is calculated that 50% of the animal ung produced on Indian farms is burnt as fuel. t is suggested that trees should be planted on rms as wind-breaks and as sources of fuel.

. The problem of weeds in India, pp. 142-165. n estimate is made of the losses caused by weeds, ncluding water hyacinth (*Eichhornia crassipes*), ans [*Saccharum spontaneum*], striga, nutgrass *yperus rotundus*), Bermuda grass (*Cynodon dac-lon*), *Pluchea lanceolata* and *Carthamus oxya-ntha* in different parts of India (pp. 142 and 158). he application of chemical weedkillers to weeds ommon in India is discussed. The effect of Meth-xone on 14 common weeds is tabulated (p. 150).

. The need for establishing seed-testing stations India, pp. 166-94.

. The use of manures in India, pp. 195-236. The esults of numerous experiments, carried out in ifferent provinces, on the effect of artificial fertilizers, farm-yard manure, compost, sewage and green manures on the yields of various crops are reviewed. Comparative figures are given (pp. 210-11) showing the yields of several crops under normal conditions and under sewage irrigation.

6. The advisory services in relation to agricultural production, pp. 237-307.—W.J.B.

1608 **United Nations.** Department of Economic Affairs. Proceedings of the United Nations Scientific Conference on the Conservation and Utilization of Resources. 1949. Vol. 6, Land resources. Lake Success, N.Y., 1951, pp. 623, illus.

The contents include :

1. Methods of soil conservation, pp. 1-54.
2. Organization and evaluation of soil conservation programmes, pp. 55-111.
3. Soil survey and research in relation to soil conservation, pp. 113-72.
4. Aids to farming, pp. 173-205.
5. Improving soil productivity, pp. 207-72.
6. Protection of crops and grasslands, pp. 309-39.
7. Storage and preservation of agricultural products, pp. 341-81.
8. Opportunities for the most effective use of new agricultural lands, pp. 561-623.—M.A.

NEWS ITEMS AND NOTES

reat Britain

09 EXPERIMENTS ON FLOODED LAND. The Ministry Agriculture announces that a number of fields in the eas flooded by the sea in January, 1953, are to be selected r experimental purposes. The experiments will cover wide range of questions—among them the responses of e soil to gypsum treatment under a variety of conditions, ethods of applying gypsum and of preparing seedbeds, e choice of suitable crops and the timing of sowings on nd damaged by sea-water. *Fmr's Wkly*, 3 July, 1953. -W.J.B.

10 INSECTICIDES. A meeting of the Crop Protection anel of the Agricultural Group of the Society of Chemical dustry was held on 16 Feb., 1953, when papers on the ysical factors in relation to biological activity of in-cticides were read. *Nature, Lond.* 16 May, 1953.—M.H.

ench West Africa

11 IRRIGATION OF THE UPPER NIGER DELTA. About ,000 ac. of land are now under crops in the newly igated tract served by the Sansanding barrage. At esent about 35,000 ac. of rice and 5000 ac. of cotton are own, and the areas under each crop are to be extended 2000 ac. each year. Cotton and rice are grown on parate blocks of land to facilitate arrangements for igation which are different for each crop. On the cotton-owing blocks the rotation employed is cotton/millet/ tton/fallow. Rice is grown continuously. The economic rangements for the farming of the region are modelled on those of the Sudan Gezira. *World Crops* July, 1953.—W.J.B.

India

1612 RICE-GROWING IN INDIA AND JAPAN. The heavy applications of plant nutrients to rice crops commonly employed in Japan (N, 80-100 lb. per ac. ; P, 60-80 lb. per ac. ; K, 50-80 lb. per ac.) are contrasted with the small dressings of manure used in India. In Japan an average response of 20-30 lb. of paddy, per lb. N applied, is obtained from dressings of 50-80 lb. N per ac., whereas in India a response of only 10 lb. of paddy, per lb. N applied, is obtained from similar dressings. In India the use of more than 40 lb. per ac. of N has been found uneconomic. *Curr. Sci.* 22, **No. 5**, 1952. —W.J.B.

USSR

1613 TRUDY OF THE KOMAROV BOTANICAL INSTITUTE. The 1953 issue of this work, Series 4, Experimental Botany No. 9, includes the following papers : Effect of the light and temperature factors on distribution and variableness of plants at the light stage of development ; The physiology of branched wheat in relation to mineral nutrition ; The effect of light of different spectral composition on some physiological processes in plants ; Indicators of the relationship between light and dark reactions in photosynthesis ; Peculiarities of oxygen respiration in plants of the high Pamirs ; Comparative ecological/physiological study of herbage plants in pure and mixed sowings. [See also *Herb. Abstr.* 23 : 376.]—M.H.

ANNUAL SUBJECT INDEX, VOL. 6, 1953

References are to abstract numbers. Where the reference is to a title only, this is indicated by an an asterisk.

Abroma augusta, 412
Abstracting, biological sciences, 405
Abutilon theophrasti — see Butterprint
Acaciella laevis, 1522
Acioa barteri, 1604
Adlay (*Coix lachryma-jobi*)—see Job's tears
Adonis aestivalis, 1123
Aerial photography for vegetation maps, 1089
Aerial spraying, herbicides and insecticides, 1125
Aerotil, 447
Aeschynomone indica, 954
Africa — see also French Africa and individual territories
  Central
    soil and water conservation, 759
    water use, 759
  East
    Agric. and For. Res. Org. Rep. 1951, 436
    flora, 406 (book)
    soil and water conservation, 759
    water use, 759
  North, maize, 550
  Sahara, wheat, 1218, 1219
  West, agriculture, 1587
Agricultural development, USSR, arid regions, 1109
Agricultural ecology, 1540*
Agricultural education, Gt. Britain (England and Wales), 389
Agricultural experimentation, 400
Agricultural land consolidation, W. Europe, 307
Agricultural mechanization, French Africa, 313
Agricultural production
  in Angola (Amboim Plateau), 740
  in Great Britain
    fertilizers, 750
    small farms, 744
Agricultural research,
  in Argentina, 1169
  in Europe, 1569
  in Nyasaland, 454
  institutions in Gt. Britain, 1583 (book)
Agricultural statistics
  for Colonial agriculturalists, 399
  in Scotland, 751
  punch card system, 1168
Agricultural survey
  by FAO 1951, 391*
  in Scotland, 290
Agriculture
  in Australia, 1091
    Queensland (Mary Valley) 1105
  in Belgium, 292, 293*
  in British Columbia, 737
  in Caribbean, 296
  in Egypt, 1497*
  in French Sudan, 1101, 1603
  in Great Britain, 745
    England
      Berkshire, 312
      Kent, 1496
      Land's End Peninsula, 1092*
    Scotland, 751
  in Japan, 409
  in Mexico, 297
  in Netherlands, 294, 1500*
  in New Caledonia, 743
  in Northern Ireland, 1094
  in Pakistan, 1590 (book)
  in Peru, 739*
  in Senegal (Sine-Saloum), 742
  in South Africa, 1506
  in Southern Rhodesia
    Mashonaland, 1508
    Matabeleland, 1508
  in Surinam, 314
  in Tanganyika (Sukumaland), 298
  in Turkey, 295
  in Uruguay, 1104
  in USA, 408, 817
  in USSR (European SSR), 1100
  in West Africa, 1587
  legumes in, 1585 (book)
  regulations (poisonous substances) 1953, in Gt. Britain, 1535
  science in, 1185 (book)
Agroclimatic districts of Brazil, 738
Agronomy, advances in, 817, 1589 (books)
Agropyron × wheat, 1602
A. distichum, 21
A. elongatum, 21
A. repens — see Couch grass
Agrosan, 119, 832
Agroxone, 276, 352, 721, 1130, 1232, 1533
  and *Capsella bursa-pastoris*, 999
  and *Vicia sativa*, 999
Alabama argillacea — see Cotton leafworm
Albinism, oats, 519 *
Aldrin, 377, 553, 705, 828, 1383
  and cereals, 372
  and flax, 372
  and sorghum, 372
  and soyabeans, 372
Algeria
  cereals, quality estimation, 130
  rice, 109
  seed production, 129
Alligator weed (*Alternanthera philoxeroides*), 1194
Allium sativum — see Garlic
A. vineale, 1192
Aloe (*Furcraea gigantea*), 1085
Alopecurus agrestis — see Blackgrass
Alpha-methylnaphthyl-methylether, 230
Alpha-naphthaleneacetic acid, 688
Alpha-naphthoxyacetic acid, 1163
Alternanthera philoxeroides — see Alligator weed
Alternate husbandry, 1108*
Amaranthus spp., 772, 834
A. caudatus, photoperiodic treatment, 783
Ambrosia spp. — see Ragweed
American bollworm, cotton, 708, 1453
Ammate, 1128
Ammonium thiocyanate, 1354
Amsacta albistriga — see Hairy caterpillar
Anastropus compressus, 773
Anglo-Egyptian Sudan — see Sudan
Angola
  Amboim Plateau
    agricultural production, 740
    flora, 740
  flora, 407
Angoumois grain moth (*Sitotroga cerealella*), 590
Anguillilina tritici — see Earcockle nematode
Annual bluegrass (*Poa annua*), 1379
Anthonomus grandis — see Boll weevil
Antibiotic (s)
  and plant growth, 446
  fungicides, 385
  terramycin, 446, 787
  thiolutin, 1159
Apera spica-venti—see Silky bentgrass
Aphanomyces cochlioides, 1376
Aphelenchoides oryzae — see White tip
Aphis sp., cocoyam, 1443
A. fabae, 162
A. laburni, groundnuts, 600
A. rumicis, beans, 612
Apocynum spp., fibre plant, 1088
Apple grain aphid (*Rophalosiphum prunifoliae*), 493
Apus spp. — see Tadpole shrimp
Arable crop experimentation, 414 (book)
Arachis hypogaea — see Groundnuts
Aramina fibre — see *Urena lobata*
Aramite, 250
Arasan, 553, 660, 912, 1376, 1380, 1486
Argemone mexicana — see Mexican poppy
Argentina
  agricultural research 1952, 1169
  Arundo donax, 1495
  Bromeliaceae, 271
  ecological regions, 1177, 1178 (book)
  fibre plants, 271
  flax, 260
  potatoes, 201
  seed potatoes, storage, 232
  soil and water conservation, 320
  soil fertility, 320
  wheat, chemical composition, 502
Armyworm (*Cirphis unipuncta*), cereals, 1328 *
Aromatic oils, 773
Arundo donax in Argentina, 1495
Asclepias spp., fibre plant, 1088
A. syriaca, 1192
Ascochyta gossypii—see Seedling blight
Asia
  South
    scientific publications bibliography, 1171
  South-East
    scientific journals, 814 *
Asphodelus tenuifolius 1232
Atterberg's barley classification, 411
Australia
  New South Wales
    Dep. Agric. Rep. 1949-50, 442
    rye, 55
    soil conservation, 1516
  North, rice, 1307

  Queensland
    Central Highlands, sorghum, 1304
    linseed growing, 273 *
    Mary Valley,
      agriculture, 1105
      soil and water conservation, 1105
    S. Burnett, maize, 907
  seed testing, 1157
  South, pulses, 615
  weeds, 776
  Western, *Datura* spp., 1528
  wheat, 1, 863
Austria, agriculture, 1091
Avena spp. — see Oats
Azuki bean (*Phaseolus angularis*) — see Beans
B*acillus cereus* var. *mycoides*, 1574
Backcross method of breeding, 422 (book)
Bacterial blight (*Xanthomonas malvacearum*), cotton, 254, 434, 709, 832, 1069, 1070, 1198, 1474
Bacterial leaf blight (*Pseudomonas alboprecipitans*), maize, 84
Bacterial pustule (*Xanthomonas phaseoli* var. *sojensis*), 974
Bacterial ring rot (*Corynebacterium sepedonicum*), potatoes, 1440
Bacterial wilt (*Xanthomonas manihoti*), cassava, 238
Bacteriosis (*Pseudomonas andropogoni*), sorghum, 107
Bacterium radicicola and groundnut inoculation, 983
B. sesami, sesame, 434
B. stewartii — see Stewart's wilt
Bambarra groundnut (*Voandzeia subterranea*), varieties, 1197
Barbarea vulgaris — see Yellow rocket
Barley (*Hordeum* spp.), 411 (book)
  after cotton, 530
  after maize, 530
  after rice, Japan, 1270
  and artificial rain, 853
  and CMU, 1531
  and copper, 1187, 1264
    sulphate and soil acidity, 1188
  and 2,4-D, 430, 538*, 539, 585, 879, 970, 971
  and herbicides, 1601
  and MCPA, 879, 970
  and sodium chlorate, 336
  and toxic gases, 795
  and ultrasonic sound waves, 780
  Atterberg's classification, 411
  boron content, 1563
  brewing quality, 899
  brown rust (*Puccinia simplex*), 831
  classification, 411
  climatic requirement, 59
  crop, 411 (book)
  cultivation, 899
  diastatic power, 70, 1276, 1280
  ear development and low soil temperatures, 904
  extract, 70
  false stripe, 493
  fertilizer(s), 54, 71, 136, 530, 540, 746, 882, 901, 906, 1280
    combine drilled, 136
    placement, 540
  foliar diagnosis, 1146
  germinal roots, 499
  germination, 480, 499, 899, 903, 1277, 1327
    in field and laboratory, 965
  growth in sterilized soil, 505
  Hordeum spp., S. America, 533
  H. andinum, 533
  H. besteroanum, 533
  H. chilense, 533
  H. coleophorum, 533
  H. flexuosum, 533
  H. pubiflorum, 533
  H. strobelense, 533
  H. utriculatum, 533
  H. valdiviae, 533
  H. vulgare
    var. *deficiens*, 532
    var. *distichon*, 532
    var. *hexastichon*, 532
    var. *intermedium*, 532
  in Gt. Britain, 411, 899
  in Netherlands, 59
  in relation to undersown clover, 66
  in Sweden, 1273
  in USA, 900
    Nebraska, 124
  iron absorption, 1317
  irrigation, 70
    overhead, 753, 828
  leaf numbers and development stage, 537
  loose smut (*Ustilago nuda*), 60, 61, 67
  malting quality, 899, 1280
  manurial value of residues and undersown herbage, 1333
  mildew, 61
  moisture content, combined grain, 137
  N content, 70
  /oats yield, 1324
  oxalate content, 1559
  phosphorus absorption, 1278
  phosphorus uptake, 1317, 1331
  physiology, 905, 1268
  plant characteristics affected by sowing date, 526
  potassium deficiency, 540
  potassium requirements, 540
  protein composition, 68 *
  protein content, 1280
    and nitrogenous manuring, 882, 906
    and sowing date, 526
    and yield, 1276
  quality, 411
  rainfall and yield, S. Dakota, 580
  root absorption of cations, 1145
  root growth and calcium, 782
  roots, and water uptake, 613
  salt tolerance, 903
  seed
    hull content, 70
    kernel weight and yield, 1276
    viviparous, 1277
  seed rate, 123, 525
  seed treatment, 23, 67, 480, 481, 482, 1327
    with X-rays, 902
  seedling growth inhibition, 69 *
  seedling irradiation, 1279
  seedling respiration, 536
  six-rowed in Norway, 63
  sowing date, 59, 525, 526
  spacing, 525
  spot blotch (*Helminthosporium sativum*), 23, 61
  storage of treated seed, 480
  tillering, 526
  uniformity trial analysis, 541
  varietal differences in Netherlands 831
  varietal identification, 532
  varietal synonyms, 532
  varieties, 64, 411, 428, 468, 526 528*, 583, 584, 810, 903, 970 1197, 1205, 1331
    Abate....969
    Abed Archer....582
    Abed Maja....531, 582, 1272
    Abed Rigel....582
    Agio....831
    Alfa....531, 539, 582
    Asa....964, 1273
    Asplund....63, 1273, 1275
    Atlas....527
    Balder....831, 1273
    Bay....71, 1280
    Bayerngerste....1323
    Black Russian C.I. 2202....535
    Bonus....964, 1272, 1273, 1274
    Brage....894, 1273
    Breusted 1038/45....831
    Brucker 2....1323
    Brucker 3....1323
    Brug 23.C.1 6491....535
    C.A.C. 21....585
    California Mariout....527
    Carlsberg....531, 582, 831, 1272 1273, 1594
    Chevron....527
    C.I. 1227....969
    C.I. 1237....969
    C.I.2376....969
    Dicktoo....1602
    Domen....901, 1275
    Dore....1273
    Drost....1272
    Earl....831, 1594
    Edda....1273
    Edda I....964
    Edda II....964, 1273
    Fero....1272
    Fraeg....1275
    Freebar....68 *
    Freja....14, 15, 539, 582, 901, 1273, 1275, 1594
    Gjølma....1275
    Goliad....1602
    Goliat....901, 1275
    Goudgerst....831
    Gull....1273
    Haisa....1323
    Haisa II....831
    Haisa III....831
    Haka....1323
    Hank....527
    Hannchen....969
    Heimdal....531, 1272, 1273, 1274
    Heine 505....831
    Heine 506....831
    Herse....14, 63, 1275
    Herta....62, 531, 582, 831, 901, 964, 1272, 1273, 1274, 1323, 1324, 1594, 1597
    Hudson....1602
    Jadar II....63
    J131K....1273
    Jotun....63
    Kaja....539
    Karn II....1324
    Kearney....1602

    - Kenbar....60, 1602
    - Kenia....14, 62, 411, 529, 831, 1273, 1274, 1275
    - Kindred....70
    - Kron....1273
    - Lenta....1273
    - Maja....901, 1273, 1275
    - Manchuria....70
    - Mars....1276
    - Maskin....63, 1275
    - Mo. B-400....61
    - Montcalm....70, 71, 585
    - Moore....70, 1280
    - Netto....1273
    - Nutans....482
    - O.A.C. 21....1280
    - Odessa....68 *
    - Opal B....63, 901, 1273, 1275
    - Øtofte Fero....531, 582
    - Pajbjerg Drot....531
    - Pallidum 17....530
    - Pirol....831
    - Plains....68*
    - Ploughstrup 544....531
    - Plumage Archer....411, 1594
    - Primus II....1273
    - Prior....862
    - Proctor....529
    - Puke II....1273
    - Rigel....539, 1273
    - Rika....62, 831, 964, 1272, 1273, 1323, 1324
    - Rojo....969
    - Sangatsu-mugi....1277
    - Saxonia....831
    - Selecta....1273
    - Sisu....1322
    - Spratt Archer....411
    - Stallar....62, 1273
    - Stallar II....62, 1273
    - Stella....964, 1273
    - Svanhals....894, 1273
    - Tammi....1273
    - Trebi.....1332
    - Tregal....70
    - Tschermaks....1323
    - Vantage....585
    - Varde....63, 901, 1275
    - Vega....964, 1273
    - Weibull's, 4808....1324
    - Wintex....1552
    - Wisa....831
    - Wis. 38....71, 1280
    - Wis. Winter × Glabion 2073.... 535
    - Ymer....531, 582, 901, 964, 1271 1272, 1273, 1275
    - York Hooded....535
    - 54-36....1273
    - 4468....1273
    - 4933....1273
    - 5113....1273
  - vernalization, 526, 1329
  - webworm (*Talis pedionoma*), 27
  - world production, 1584
  - yield and rainfall, S. Dakota, 580
  - yield and soil water, 3
  - yield reduced by straw compost ploughed-in, 746
- Barnyard grass (*Echinochloa crus-galli*), 954, 1379
- Barnyard grass mosaic, wheat, 493
- Basin-lister, 435
- Basket grass (*Rottboellia myurus*), 1520
- Basutoland
  - Dep. Agric. Rep. 1950, 1952, 837, 1201
  - soil and water conservation, 1201
- Batadella (*Isachne australis*), 954
- Beans — see also *Vicia* spp.
  - and artificial rain, 853
  - and CMU, 1531
  - and ultrasonic sound waves, 780
  - *Aphis rumicis*, 612
  - black bean aphid (*Aphis fabae*), 162
  - *Canavalia ensiformis*, 1151
  - fertilizer(s), 426, 828
    - placement, 828
  - in rotation, 612
  - *Phaseolus* spp.
    - root formation and Röntgen rays, 998*
    - sowing date, 1197
    - spacing, 1197
    - varieties, 1197
  - *Ph. aborigineus*, 1356*
  - *Ph. aconitifolius* (makti), 755
  - *Ph. angularis* (azuki), *Heterodera glycines* on, 1340
  - *Ph. aureus*, 839
  - *Ph. coccineus* (Spanish runner), *Heterodera glycines* on, 1340
  - *Ph. lunatus* (lima), 1151
  - *Ph. mungo* (mung), 839
    - germination, 1140
  - *Ph. radiatus* (green gram), 947
    - germination, 1140
    - seed treatment, 1141
    - selenium content, 165
  - *Ph. vulgaris*
    - and maleic hydrazide, 163
    - *Heterodera glycines* on, 1340
    - nodules, 434, 996*
    - *Rhizobia*, 1150
    - root promotion and vitamins, 997,
    - transpiration studies, 1355
    - varieties, 1355
  - phosphorus absorption by foliage, 784
  - production costs, Scotland, 806
  - *Rhizoctonia solani*, 1350
  - seed treatment, 1350, 1542
  - *Sitona lineata*, 614
  - *Stizolobium utile* (velvet), 1151
  - tick, 162
  - varieties, 1205
  - *Vicia faba*
    - and oats, 609
    - bird damage, 609
    - chocolate spot (*Botrytis cinerea*), 608, 1572
    - defoliation, artificial, 1354
    - factors affecting yield in England, 608
    - in France, 607
    - plant density, 609
    - roots, and water uptake, 613
    - seed rate, 426, 609, 845
    - seed storage, 1576
    - seed treatment, 1576
    - sowing date, 609
    - spacing, 426, 608
    - variability, 610*
    - watering and yields, 617
    - weather requirements, 168
    - yields, 609
  - weeds in, 772, 1130
- Bechuanaland
  - soil and water conservation, 759
  - water use, 759
- Bees and herbicides, 1135
- Bees and insecticides, 257, 828
- Beet eelworm (*Heterodera schachtii*) in Denmark, 180, 181
- Beet fly (*Pegomyia hyoscyami*), sugar-beet, 830
- Beet yellows, sugar-beet, 629*, 828
- Belgian Congo
  - climate, 1197
  - INEAC Rep. 1951, 1197
  - native rural economy, 741*
  - Ruanda-Urundi, flora, 1179 (book)
- Belgium
  - agriculture, 292, 293*
  - maize, 73, 74
  - sugar-beet yields, 1366
- Bengal gram (*Cicer arietinum*)—see Chickpea
- Bermuda grass (*Cynodon dactylon*), 334, 335, 773, 1127, 1607
- Berseem (*Trifolium alexandrium*), 1360
  - oxalate content, 1559
- Beta-naphthoxyacetic acid, 1163, 1601
- *Beta* spp. seed production, 845
- *B. atriplicifolia*, 181
- *B. lomatogona*, 181
- *B. macrocarpa*, 181
- *B. maritima*, 181
- *B. patellaris*, 181
- *B. procumbens*, 181
- *B. trigyna*, 181
- *B. vulgaris*—see Mangels and Sugar-beet
- *B. vulgaris* var. *saccharifera*—see Sugar-beet
- *B. webbiana*, 181
- Bexadust, 801
- BHC, 252, 485, 612, 705, 799, 801, 828, 830, 832, 836, 839, 1059, 1453, 1470
  - and cotton, 714
  - and potatoes, 1047*
- Bibliographies
  - British books 1952, 1170
  - scientific publications of S. Asia 1171*
  - sorghum, 821
  - weed investigations, U.S. Dep. Agric 1182
  - wheat diseases, Brazil, 869*
- Bimlipatam jute—see Kenaf
- Bird(s)
  - and rice, 957
  - grain-eating, 434
  - pests in agriculture, 1164
- Blackarm (*Xanthomonas malvacearum*) —see Bacterial blight
- Black bean aphid (*Aphis fabae*), 162
- Black dot (*Colletotrichum* sp.), potatoes, 1037
- Blackeye bean—see Cowpeas
- Black gram (*Phaseolus mungo*)—see Mung
- Blackgrass (*Alopecurus agrestis*), 1521
- Black leg , sugar-beet, 627
- Black rust (*Puccinia graminis*)
  - alternate hosts, 135*
  - wheat, 486, 1235
- Black sandmites, cereals, 801
- Black spot, potatoes, 211, 212
- Black stem rust (*Puccinia graminis tritici*), wheat, 25, 491, 862, 1230

- Blast (*Piricularia oryzae*), rice, 117, 118, 1311
- *Blechnum* sp., 314
- Blight—see Late blight
- *Blissus leucopterus*—see Chinch bug
- Bog cultivation, Norway, 824
- Bogland reclamation, Wales, 291
- Boll weevil (*Anthonomus grandis*), cotton, 252, 377, 1463, 1464, 1465*, 1466
- Bollworm (*Heliothis armigera*)
  - cotton, 249, 1463
  - cowpea, 1335
- Book lice (Psocidae), 590
- Borasan, 1127
- Bordeaux mixture, 661, 1486, 1597, 1599
- Boron
  - and cotton, 1475
  - and flax seed germination, 261
  - and sugar-beet, 179, 1375*
  - deficiency
    - in flax, 1563
    - in mustard (white), 1563
    - in rape, 1563
  - in plants and soil, 1563
  - plant needs, 431
- *Botrytis fabae*—see Chocolate spot
- Bracken (*Pteridium aquilinum*), 324, 325, 326, 1595
- *Brassica* spp., natural crossing, 788
- *B. arvensis*—see Wild mustard
- *B. campestris*—see Wild turnip
- *B. campestris* var. *oleifera*—see Rape
- *B. campestris* var. *oleifera* subvar. *biennis*—see Rape
- *B. juncea*—see Mustard
- *B. napus*—see Rape
- *B. napus* var. *oleifera*—see Rape
- *B. napus* var *oleifera* sub-var. *biennis*—see Rape
- *B. nigra*—see Mustard
- *B. oleracea*—see Cabbage
- *B. rapa*—see Turnips
- *B. rapa* var *esculenta*, metabolism, 1549
- *B. rapa* var. *oleifera*, metabolism, 1549
- *B. tournefortii*—see Wild turnips
- Brazil
  - cassava, 238
  - Job's tears, 121
  - potatoes, 193
  - Rio Grande do Sul, agroclimatic districts, 738
  - Sao Paulo
    - cotton, potash hunger, 710
    - cotton, rust, 710
    - rice, 110
    - wheat diseases, bibliography, 869*
- Breeding by backcrossing, 422*
- British Columbia, agriculture, 737
- British Commonwealth, insect pests, 826
- British Guiana, Dir. Agric. Rep. 1950, 835
- British West Indies, Devel. and Welfare Org. Rep. 1951, 433
- Brome grass (*Bromus inermis*), 1127
- Bromeliaceae in Argentina, 271
- *Bromus* spp., 430
- *B. inermis*—see Brome grass
- *B. marginatus*, 459
- Broom corn (*Sorghum dochna* var. *technicum*), 1303
- Browning—see Brusone
- Brown rust
  - *Puccinia simplex*, barley, 831
  - *P. triticina*, wheat, 13, 486
- *Bruchus pisorum*—see Pea weevil
- Brusone, rice, 956
- Buckwheat (*Fagopyrum* spp.), 885
  - *F. emarginatum*, 884
  - *F. esculentum*, 884
    - seed treatment, 507
  - *F. stenocarpa*, 884
  - *F. tataricum*, 328, 884
  - in France, 884
  - seeds, 884
  - varieties, 810, 1205
  - viviparous, USSR, 885
- Bunt
  - oats, 442
  - *Tilletia tritici*, wheat, 487, 1597
- Butterprint (*Abutilon theophrasti*), 1126
- **C** & C5400, 912
- Cabbage (*Brassica oleracea*), vegetative reproduction, 1446
- Cabbage (cattle)
  - chemical composition, 1592
  - fertilizers, 1592
- Cabbage root fly (*Erioischia brassicae*)
  - swedes, 186
  - turnips, 186
- Cabbage stem flea-beetle (*Psylliodes chrysocephala*), 1059
- Caffaro dust, 1576
- *Cajanus cajan*—see Pigeon pea
- *C. indicus*, green manure, 1249
- *Calandra granaria*—see Grain weevil
- *C. oryzae*—see Rice, weevil
- Calcium
  - cyanamide, 337, 702, 1123, 1191, 1231, 1416, 1600
  - deficiency, maize, 1294
  - nitrate, 158,
  - polysulphide, 490
  - sulphide, 486
- Californian stinkweed (*Gilia squarrosa*), 1529
- Calomel dust, 186
- *Calystegia sepium*—see Greater convolvulus
- Cambodia, rice, 570
- Camelina (*C. sativa*) in Sweden, 283
- Canada
  - Dep. Agric. Rep. 1952, 1599
  - East. Sect. Nat. Weed Contr. Cttee Proc. 1951, 1600
  - fungicide tests, 805*
  - Manitoba Dep. Agric. Conf. Agronomists 1952, 1190
  - Ontario
    - Dep. Agric. Rep. 1950, 429
    - North
      - climate, 1103
  - potatoes, seed certification, 653*
  - safflower, 279
  - seed production regulations, 368
  - wild rice (*Zizania aquatica*), 114
- Canada thistle (*Cirsium arvense*), 774, 1192, 1601
- *Canavalia ensiformis*—see Jack bean
- *Cannabis sativa*—see Hemp
- Capeweed (*Cryptostemma calendulaceum*), 1529
- *Capsella bursa-pastoris* and Agroxone, 999
- Carbon tetrachloride, 591
- Carboxide, 1440
- *Cardaria* [*Lepidium*] *draba*—see Hoa pepperwort
- Caribbean, agriculture, 296
- Carrots and krilium, 404
- *Carthamus* spp.—see Safflower
- Cassava (*Manihot utilissima*)
  - bacterial wilt (*Xanthomonas man hoti*), 238
  - fertilizers, 238, 841
  - germination, 440
  - in Brazil, 238
  - maize intersown, 1197
  - seed treatment, 440, 1197
  - sett size, type and yield, 238, 239
  - sowing date, 238
  - spacing, 238
  - varieties, 1197, 1604
    - Kekabu....700
    - Liongo....838
    - Medan....700
    - Philippine....239
  - yield, and time of lifting, 700
- *Cassia*, sp., green manure, 838
- *C. chamaecrista*—see Partridge pea
- Catch crops
  - in Netherlands, 543
  - serradella/maize, 543
  - Westernwolths ryegrass/maize, 543
- *Caucalis lappula*, 1123
- *Centaurea repens*—see Russian knapweed
- *Centrosema pubescens*, cover crop, 1513
- *Cephalaria syriaca*, 1233
- *Cephalonema polyandrum*, 412
- *Cercospora beticola*—see Leaf spot
- *Cercosporella herpotrichoïdes*—see Foot rot
- Cereals—see also individual crops
  - acreage by varieties, England and Wales, 126
  - and 2, 4-D, 134
  - and herbicides, 586
  - and MCPA, 134
  - and weather, 125
  - armyworm (*Cirphis unipuncta*), 1328*
  - awns and yield, 874
  - black sandmites, 801
  - breeding, 1334
  - diseases, 1596
  - drilling depth, 1207
  - drying, 142, 143, 144, 932, 933
  - earth fleas, 801
  - fertilizer placement, 136, 588*
  - flat grain beetle (*Laemophloeus* spp.), 591
  - foot rot
    - *Cercosporella herpotrichoïdes*, 22
    - *Ophiobolus graminis*, 22
  - fumigation in store, 590, 142, 144
  - growth studies, 829
  - harvesting methods, 141
  - *Hypogymna morio*, 968
  - in Kenya, 862
  - in Netherlands, 413
  - lodging, 1239
  - loose smut (*Ustilago* spp.), 967
  - manurial value of residues and undersown herbage, 1333
  - moisture content, combine grain, 137, 142
  - moisture content determination methods, 138, 973
  - plant population and yield, 1207
  - quality estimation in Algeria, 130

  seed bed preparation, 1602
  seed death, 1326
  seed disinfection thermo-electrical, 967
  seed production in France, 128
  seed rate, and nitrogen dressings, 123
  seed treatment, 966, 1326
  short-fruited wild turnip in, 768
  silos, ventilated, 140
  sowing date, 123, 426
  sowing methods, 589
  spacing, 123
  storage, 591
    pests, 590
  stubble weight, 1207
  trials, 1596
  undersown with legumes, 1533
  varietal purity maintenance, 1325
  varieties, 126, 127*, 582
    and areas, Finland, 1322
  virus diseases, 493
  Ward's weed in, 766
  water table and yield, 1504
  weeds in, 133, 1192, 1195
    hoeing v. spraying, 1321
  wild oats in, 1600
  wild turnips in, 767
  windrowing, 397
  wireworm, 584
  yellow-dwarf virus, 969
Ceresan, 480, 1159, 1346, 1380
Cestrum parqui—see Green cestrum
Ceylon
  cotton, 703
  Dir. Agric. Admin. Rep. 1950, 840
  rice, 754
  soil and water conservation, 756
  weeds manual, 819
Chara fragilis, 434
Charlock (*Sinapis arvensis*), 331
Chavali (*Vigna catjang*)—see Cowpeas
Chemotherapeutic activity, growth substances, 1163
Chenopodium alba—see Lambsquarters
Chickpea(s) (*Cicer arietinum*), 839
  germination, 1140
  in Italy, 1357
  morphology, 1357
  seed storage, 1576
  seed treatment, 1576
  selenium content, 165
  spacing, 166
Chickweed (*Stellaria media*), 772, 1530
Chinch bug (*Blissus leucopterus*)
  on maize, 1293
  on wheat, 1293
Chlordane, 252, 257, 828, 1011
Chloridea dipsacea, millet, 106
4-chlorophenoxyacetic, acid, 1601
Chloropicrin, 591, 1536
Chloroxone, 434
Chocolate spot (*Botrytis fabae*), beans, 608, 1572
Chromium and cotton, 1475
Chrysanthemum segetum, 1526
Chrysopa vulgaris, 666
Cicer arietinum—see Chickpeas
Cichorium intybus, 1192, 1600
Cinnabar moth, 323
Cirphis unipuncta—see Armyworm
Cirsium arvense—see Canada thistle
Clappertonia, 412
Climate
  analogues in Ontario (North), 1103
  and wheat growth, 852
  classification, 1177
  in Argentina, 1177
  in Belgian Congo, 1197
  in USSR, 1186
Climatic requirements of crops in Silesia, 791
ClIPC, 339, 430, 596, 704, 834, 1008, 1009, 1133, 1378, 1601
Clover
  Melilotus alba (sweet), 459, 1232
    as green manure for wheat, 458
  M. indica, 1232
  Trifolium incarnatum (crimson)
    manganese deficiency, 671
  T. pratense (red), 1130
    in rotation, 442
    undersown in oats, 41
CMU, 334, 430, 692, 704, 834, 1122, 1127, 1191, 1416, 1530, 1600, 1601
  and barley, 1531
  and beans, 1531
  and maize, 924, 1531
  and oats, 1531
  and potatoes, 1531
  and wheat, 1531
Cnaphalocrocis medinalis, rice, 440
Cobalt and oats, 1261
Cockchafer (*Melolontha vulgaris*), 388
Cocklebur (*Xanthium* sp.), 1062
Cocoyam (*Colocasia antiquorum*)
  Aphis, 1443
  Pythium, 1444
  Tarophagus proserpina, 1443
Cogon (*Imperata cylindrica*), 322, 773, 1522, 1523
Coix gigantea, 954
C. lachryma-jobi—see Job's tears
Colchicine
  and mung, 1141
  and seed potatoes, 655
Cold requirement of wheat, 1242, 1243, 1244
Cold resistance, 1558*
  oats, 50
  wheat, 878, 1240, 1241, 1243, 1244
Coleus parviflorus in India, 1607
Collective farms in USSR (Ukraine), 1186, 1510, 1511*
Colletotrichum sp.—see Black dot
C. graminicolum—see Leaf anthracnose
Colletotrichum wilt, potatoes, 1417
Colocasia antiquorum—see Cocoyam
Colorado beetle (*Leptinotarsa decimlineata*), potatoes, 422, 666
Compound 269, 706
Convolvulus arvensis—see Field bindweed
Cop-o Zinc, 661, 1599
Copper, 1462
  and barley, 1187, 1264
  and cotton, 1475
  and kale, 1187
  and oats, 1187, 1264
  and rye, 1187
  and sugar-beet, 1187
  deficiency in plants, and enzyme activity, 1564
  oxide, 660, 1486
  preparations, 1381
  sulphate, 434, 507, 723
    and barley, 1188
    and wheat, 1188
  + zinc + DDT, 1462
Corchorus spp.—see Jute
Corky spot, sweet potatoes, 1052
Corn borer—see European corn borer,
Corn earworm (*Heliothis armigera*) 88, 940*, 1291, 1302,
Corn grass—see Maize
Corn rootworm (*Diabrotica longicornis*), 1292
Corn stalk borer (*Sesamia* sp.), maize, 836
Corynebacterium sepedonicum—see Bacterial ring rot
C. tritici, 494
Cotton (*Gossypium* spp.)
  after fallow, 832
  American bollworm, 708, 1453
  American upland varieties, 1071
  and BHC, 714
  and boron, 1475
  and calcium cyanamide as defoliant, 702
  and chromium, 1475
  and copper, 1475
  and 2,4-D, 1072
  and electromagnetic waves, 1477
  and groundnuts interplanted, 1605
  and maleic hydrazide, 1077
  and manganese, 1475
  and Methoxone, 434
  and sodium fluosilicate as defoliant, 702
  and ultrasonic sound waves, 780
  and zinc, 1461, 1475
  aphid, 708
  bacterial blight (*Xanthomonas malvacearum*), 254, 434, 709, 832, 1069, 1070, 1198, 1474
  boll and bud shedding, 713, 832
  boll weevil (*Anthonomus grandis*), 252, 377, 1463, 1464, 1465*, 1466
  bollworm (*Heliothis armigera*), 249, 1463
  breeding, 422
  crabgrass in, 834
  cultivation, 832, 1065
  defoliants, 430, 702, 712, 832, 1454
  Empoasca sp., 1469
  fertilizer(s), 245, 256, 715, 832, 1024*, 1197, 1451, 1606
    placement, 832
  fibre formation, 1478
  fibre strength and physiology, 1075
  germination, 1474
  G. arboreum var. Gaorani 6....1452
  G. barbadense, lint, origin and development, 1074
  G. herbaceum, spacing, growth and yield, 1451
  G. herbaceum var. *acerifolicum* var. Surti....244
  G. hirsutum
    leaf roller (*Sylepta derogata*), 1470
    lint, origin and development, 1074
    varieties, 1469
  G. hirsutum × *barbadense* hybrid, India, 1066
  G. purpurascens var. Mocó....1458
  green manure, 832
  grown from cuttings, 1073
  in Ceylon, 703
  in Egypt, 1586
  in French Africa (North), 246, 1064
  in Gold Coast, 836
  in India, 245

    Madras, 1455, 1456
  in Nyasaland, 241*
  in Romania, 1447*
  in rotation, 453, 832, 1197
  insecticides, 707*
  interplanted with maize, 242, 1606
  in Uganda, 1448*
  in Uruguay, 1195
  in USA, 1449*
    Alabama, 243
    research 1951, 258
  irrigation, 832, 1024*
    yield and rainfall, 1076
  jassids, 701
  leaf curl, 416 (book)
  leafworm (*Alabama argillacea*), 377, 1068, 1466
  lint
    origin and development, 1074
    staple length determination, 255
  Lygus spp., 1198
  L. vosseleri, 1469
  mechanical picking, 832
  micronutrients and yield, 1475
  molybdenum content, 1476
  mulching, 832, 1197
  pests in USA (Alabama), 253
  physiology, 711
  pigweed in, 834
  pink bollworm (*Platyedra gossypiella*) 249
  plant electrocution, 834
  potash hunger, Brazil, 710
  production in Texas, 1063
  rainfall and yield, 1452
  red bollworm (*Diparopsis castanea*), 242, 832
  red disease, Brazil, 710
  red leaf disease, 1071
  root knot nematode (*Meloidogyne incognita* var. *acrita*), 1467
  rust, Brazil, 710
  salt-marsh caterpillar (*Estigmene acraea*), 1466
  seedling blight (*Ascochyta gossypii*), 1191
  seedlings and dinitro compounds, 1462
  seed production, 1457
  seed rate, 701
  seed storage, 1460
  seed treatment, 434, 709, 832, 1069, 1159, 1197, 1474, 1477
  seed viability estimation, 1459
  Shimbu, 1197
  sowing date, 242, 245, 701, 832, 1452, 1605
  spacing, 244, 701, 1197, 1605
  species, 407
  spider mite (*Septanychus texazona*), 250
  stainer, 1453
  sting nematode (*Belonolamius gracilis*), 1468
  thrips, (*Frankliniella tritici*), 705
  two-spotted mite (*Tetranychus bimaculatus*), 250
  types
    Bulgarian 49....713
    Cambodia....1455
    Cocanadas....1455
    Northerns....839, 1455
    Sea Island....839
    Tinnevellies....1355
    Westerns....839, 1455
  varieties, 245, 247*, 1073, 1074, 1075, 1197, 1456
    American....839
    B181....832
    BD....832
    BP52....832
    BP79....703
    Campinas I.A. 817....710
    CL20....1606
    Co. 2....703
    Co. 3....703
    Cocanadas,....839
    Coker 100 Wilt....1072
    D28....836
    D and PL Fox....248
    Deltapine 15....248
    Dharwar I....256
    Dharwar II....256
    Empire....248
    100F....1470
    Jarila....1067
    Jaywant....256
    Karonga CLB....1606
    Karunganni....839
    K.P. 28....832
    Lankart 57....248
    Lockett 140....248
    Madras Uganda I....701
    Madurai....839
    Mebane 6801....248
    MSI....832
    Mwanza 561....703
    N17....832
    Ngabu CLB....1606
    N'Kourala....453
    Northern Star....248
    Perso-American....1470
    S47....832
    S4108....832
    Sakel....1474
    Stoneville 62....248
    Stormproof No. 1....248
    Tinnevelli....839
    UK48....832
    VH 8....832
    VH10....832
    Virnar....1067
    9L34....832
    5413 x Cambodia....703
    42204....832
  verticillium wilt (*V. dahliae*), 832
  water-table and yield, 1586
  weed control equipment, 834
  weeding and yields, 1453
  weeds in, 339, 704, 772
  white-fringed beetle (*Graphognathus peregrinus*), 251
  wilt (*Fusarium vasinfectum*), 1461
  yellow-striped armyworm (*Prodenia ornithogalli*), 706
  yield prediction, India, 715
Cotton stainer (*Dysdercus superstitiosus*) on sorghum, 567
Couch grass (*Agropyron repens*), 334, 336, 1124, 1127, 1192, 1531, 1533, 1600, 1601
Cover crops
  Centrosema pubescens, 1513
  maize, 757
  Mucuna, 1513
  oats, 41
  Tithonia diversifolia, 1523
Covered smut (*Ustilago avenae*), oats, 44
Cowpea(s) (*Vigna sinensis*), 1151
  and maize interplanted, 1604
  as green manure, 110
  Etiella zinckenella, 1335
  Heliothis armigera, 1335
  Lygus elisus, 1335
  L. hesperus, 1335
  Prodenia praefica, 1335
  pseudonodulation induction, 1361
  varieties, 1605
    Musaia....439
Crabgrass (*Digitaria* spp.), 692, 772
  in cotton, 834
Crag 658, 1599
Crag Herbicide No. 1 and soyabeans, 597
Crop(s)
  and toxic gases, 795
  and weather, 189
  climatic requirements in Silesia, 791
  drying, 424 (book)
  irrigation and evapotranspiration, 752
  nutrition 1108*
  production
    agronomy, 1588 (book)
    and manganese, 359*
    costs, Scotland, 806
  protection
    costs, 418 (book)
    problems, 1181 (book)
  sampling, 402
  yields in Netherlands, 843
Cropping
  plan in Netherlands, 310
  science and practice, 423 (book)
Cross-pollination in mustard and rape, 1061
Crotalaria juncea, 1151
C. lanceolata, 1151
C. mucronata, 1151
Crows, 1164
Cryptostemma calendulaceum—see Capeweed
Curly dock (*Rumex crispus*), 1126
Curvularia sp.—see Leaf blotch
Cylas formicarius elegantulus—see Sweet potato, weevil
Cynodon dactylon—see Bermuda grass
Cyperus dehiscens, 954
C. esculentus—see Nutgrass (Northern)
C. ferruginescens, 1524
C. giganteus 314
C. rotundus—see Nutgrass
Czechoslovakia, flax 1497*
2, 4-**D**, 51, 104, 133, 323, 352, 573, 586, 596, 692, 766, 767, 768, 771, 774, 834, 893, 921, 922, 1039, 1120, 1122, 1127, 1128, 1130, 1133, 1162, 1163, 1181, 1182, 1190, 1191, 1195, 1330, 1481, 1524, 1526, 1600, 1601
  absorption by plants, 1532
  and barley, 430, 538*, 539, 585, 879, 970, 971
  and cotton, 1072
  and flax, 1533
  and groundnuts, 1345
  and linseed, 728, 1533
  and maize, 92, 430, 431, 923
  and oats, 52, 430, 513, 539, 585, 879, 896, 970, 971
  and plant enzymes, 1601
  and potatoes, 219*, 648, 678
  and rice, 116
  and soyabeans, 152, 431, 975, 976

  and sugar-beet, 1390
  and sunflowers, 734
  and weed germination, 1126
  and wheat, 34, 484, 585, 879, 970, 971
  bacterial utilization, 534
  detection, 373
  penetration studies, 975
  respiratory effect, 1532
  toxicity studies, 1132
Damping-off, peas, 993
Datura spp. in W. Australia, 1528
Day nettle (*Galeopsis tetrahit*), 1130
DCP, 834
DCPA, 434, 1181
DD, 208, 335, 664, 665, 765, 828, 1467, 1468, 1536
DDT, 27, 88, 249, 251, 252, 257, 277, 434, 555, 575, 603, 705, 706, 708, 800, 802, 828, 830, 832, 836, 1059, 1289, 1302, 1335, 1453, 1470, 1576
  in carbon tetrachloride, 90
Defoliants, 702, 712, 832, 834
  ammonium thiocyanate, 1354
  DNC, 1422
  monosodium cyanamide, 1354
  Penco Defolate, 1454
  phenol, 1422
  sodium arsenite, 1422
  Tufan, 1422
Defoliation, artificial, field beans, 1354
Dehydrase
  telluric acid, 779
  2,3,5-triphenyltetrazolium chloride, 779
Delphinium consolida, 1123
Denmark
  beet eelworm (*Heterodera schachtii*), 180
  Brassica spp., crossing and regulations, 788
  mustard, (*Sinapis alba*), 286
  rye yields and soils, 523
  seed certification, 131
Denocate, 434
Diabrotica longicornis—see Maize
D. undecimpunctata howardii—see Groundnuts
Diatraea crambidoides—see Southern cornstalk borer
Dichloral urea, 430, 1378, 1416
Dichlorobutene mixture, 664
2,4-dichlorophenoxyethyl sulphate, 1574
Dichromena ciliata, 1524
Dicopur, 52
Dicotox, 352, 440, 723, 1232
Dictionary of plants in USSR, 1186 (book)
Dieldrin, 252, 257, 377, 553, 705
  and cereals, 372
  and flax, 372
  and sorghum, 372
  and soyabeans, 372
Diethoxythiophosphoric acid ester of 2-ethyl mercaptoethanol, 159
Digitaria spp.—see Crabgrass
Dinitros, 1600, 1601
DINOC, 442
Diparopsis castanea—see Red bollworm
Dithane D-14, 1599
Dithane Z-78, 831, 1380
Ditylenchus dipsaci—see Oats
DNBP, 133, 158, 829, 1130
  and flax, 1079
DNC, 1422
DNOC, 133, 158, 276, 339, 721, 773
  and flax, 1079
  and rye, 829, 1330
  and wheat, 1330
DNOSBP, 150, 596, 602, 647, 692, 704, 834, 1191, 1345, 1416, 1533
  and soyabeans, 834
Dolichos biflorus—see Horse gram
D. lablab
  varieties, 839
    E.C.R. 135....434
Dorytox, 1125
Dow 66, 647, 692, 834, 992, 1380
Dowcide G, 597
Dowfume, 153, 664, 665
Downy mildew (*Peronospora schachtii*), sugar-beet, 1368
Dowspray 66 Improved, 215
Drainage
  in Netherlands, 302, 304, 305
  in Surinam, 314
Drought
  damage to oats, 1254
  incidence evaluation, 1581
  resistance, 1247
    and seed treatment, 482
    and starch content, 1154
    maize, 1285
    plant(s), 1186
      breeding for, 1153
    wheat, 872, 1247
Dry farming in India
  Deccan, 1509
  Karnatak, 1509
Dura (*Sorghum vulgare*)—see Sorghum
Dysdercus superstitiosus—see Cotton stainer
E605, 802
Earcockle nematode (*Anguillulina tritici*), wheat, 494
Earth fleas on cereals, 801
Earworm (*Heliothis armigera*), sweet corn, 1302
East Africa, rainfall, 1102*
Echinochloa colona, 954
E. crus-galli—see Barnyard grass
E. frumentacea, 954
E. stagnina, 954
Ecology, agricultural, 1540
Economic botany, 822 (book
Ecuador
  economic plants, 396
  scientific institutions, 394*
Eelworm (*Heterodera* spp.)
  H. marioni, potatoes, 207 693
  H. rostochiensis, potatoes, 208, 209, 662, 663, 664
  H. schachtii, 180, 181
Egypt
  agriculture, 1497*
  cotton, 1586
Eichhornia crassipes—see Water hyacinth
Eire—see Ireland, Republic of
Electric fencing, 1183 (book)
Elephant grass (*Pennisetum purpureum*), 758, 832
Eleusine coracana—see Finger millet
Empoasca sp., cotton, 1469
Endothal, 430, 1009, 1377
  and sugar-beet, 1378
Endrin, 1290, 1471*
England—see Great Britain
EPN, 250, 377, 705, 706, 1472*
Equisetum sp.—see Horsetail
Erioischia brassicae—see Cabbage root fly
Erosion—see Soil erosion
Erysiphe graminis—see Powdery mildew
Erythrina glauca, 314
Esthonia, potato storage, clamps and cellars, 683
Estigmene acraea—see Salt-marsh caterpillar
Ethylene dibromide, 208, 828, 1383, 1468
Etiella zinckenella on cowpea, 1335
Etilon, 1424
Euchlaena mexicana—see Teosinte
Eupatorium odoratum, 1523
Euphorbia spp.—see Spurge
Europe
  agricultural land consolidation, 307
  maize, 550
European corn borer (*Pyrausta nubilalis*), 86, 87, 556, 1285, 1289
Evapotranspiration and crop irrigation, 752
Experimental field method, 401*, 403
Experimental method, significance tests, 808
F1003, 661
Fagopyrum spp.—see Buckwheat
Fallows and weeds, 1124
False stripe, barley, 493
FAO
  activities 1950-2, 392*
  agricultural survey 1951, 391*
  Internat. Rice Comm., 579
Farming systems
  collective farms, USSR, 1186, 1511*
  dry farming, India (Deccan and Karnatak), 1509
  irrigation farming, USSR, 1501
  ley farming, 460, 748, 1108
Fat hen (*Chenopodium album*)—see Lambsquarters
Fermate, 660
Fernasan, 829, 838, 1350
Fernoxone, 839, 1232
Fertilizer(s), 816
  and rotations, 749
  and sowing date, 1197
  barley, 54, 71, 530, 540, 746, 882, 901, 906, 1280
  beans, 426, 828
  cabbage (cattle), 1592
  cassava, 238, 841
  cotton, 245, 256, 715, 832, 1024* 1197, 1451, 1606
  finger millet, 438, 962
  flax, 721
  foliar diagnosis, 362
  fodder-beet, 1367, 1403, 1592
  groundnuts, 601, 985, 987*, 988, 989*, 1197, 1604, 1605
  guinea corn, 1604
  in Northern Ireland, 1094
  -irrigation in Italy, 37
  kale, 1592
  kenaf, 1085, 1086
  linseed, 726, 1055, 1488
  lucerne, 522
  lupins, 1358, 1359
  maize, 438, 1197, 1513, 1604, 1605
  mangels, 640
  millet, 944*

  mustard, (*Sinapis alba*), 286
  oats, 54, 521, 522
  peas, 617, 828, 995
  placement
    barley, 540
    beans, 828
    cereal crops, 136, 588*
    cotton, 832
    peas, 828, 995
    potatoes, 828
  poppy (opium), 1488
  potatoes, 221*, 222, 644, 673, 679, 680, 681, 828, 1028
  rice, 439, 578, 840, 962, 1250, 1612
  rye, 504, 1252
  sorghum, 108, 437, 438, 562, 946
  soyabeans, 598, 1342
  -sprinkler irrigation, 317
  sugar-beet, 640, 746, 1022, 1023, 1024*, 1363, 1364, 1367, 1398, 1399,
  swedes, 1367
  sweet corn, 1300
  sweet potatoes, 696
  Urena lobata, 1197
  usage, Gt. Britain, 750
  wheat, 36, 37, 38, 486, 504, 838, 855, 881*, 882, 883, 1188, 1248, 1249, 1250, 1251, 1252
  yams, 1604
Fibre plants in Argentina, 271
Field beans (*Vicia faba*)—see Beans
Field bindweed (*Convolvulus arvensis*), 334, 430, 774, 1190, 1232, 1601
Field crops in Netherlands, variety list 1952, 395*
Field experimental method, 401*, 403, 1165*, 1166, 1185 (book), 1596
  analysis of variance, 1167
  incomplete block designs, 1580
  weed control experiments, 1191
Fimbristylis miliacea, 954
Finger millet (*Eleusine coracana*), 102
  fertilizers, 438, 962
  sowing date, 1197
  varieties
    Fumbata....102
    Phagalala....102
Finland
  cereals, 1322
  cereal seed treatment trials, 966
  light and plant growth, 587, 793
  Porvoo island group, flora, 1505*
  varietal trials, 865
Flat grain beetle (*Laemophloeus* spp.), 590, 591
Flax (*Linum usitatissimum*), 1222, 1480
  and Aldrin, 372
  and 2,4-D, 1533
  and Dieldrin, 372
  and DNBP, 1079
  and DNOC, 1079
  and growth substances, 1483
  and MCPA, 829, 1079, 1533
  and preceding crops, 718
  boron content, 1563
  boron deficiency, 1563
  botany, 724
  fertilizers, 721
  foxtail in, 1481
  germination, 261, 1327
  harvesting, 259*, 721
  in Argentina, 260
  in Czechoslovakia, 1479*
  in Germany, 717
  in Uruguay, 1195
  in USSR, 1078
  quality, 829
  rust (*Melampsora lini*), 724, 729, 1482
  seedling, growth inhibition studies, 1483, 1484
  seed rate, 721
  seed treatment, 829, 1327
  sowing date, 717, 721, 1480
  stems, hemicelluloses and pectins, 1080*
  varietal identification by sepal spots, 725
  varieties, 260, 449, 716
    Boyup....719, 1222
    Cascade....1482
    Concurrent....720, 721
    Daros II....717
    E2E3....722
    Formosa....721, 1198, 1482
    Gerda....721
    Hareskovgaard 75....720
    Hercules....721
    Hollandia....1198
    Kristina....721
    Liral Prince....720, 1482
    Liral Sussex....720, 1482
    Margareta....721
    Margareta 637....720
    Norfolk Earl....1482
    Norfolk Mandarin....1482
    Øtofte 16....1482
    Øtofte 47....1482
    Percello....720
    Priekulu 665....720
    Stakhanovets....724
    Stormont Cirrus....1482
    Stormont Gossamer L26....427
    Stormont Motley....1482
    Svalöf's O.29b....1582
    Svalöf's O.200....1482
    Textilschick....724, 1482
    USSR No. 2....724
    Verum....1482
    Wada....724
    Wiera....829, 1482
    1288/12....724
  water requirements, 717
  weeds in, 721, 723, 724, 772, 829, 1601
  wild oats in, 1481, 1601
Flea beetle, linseed, 726
Flora
  Anglo-Egyptian Sudan, 1180 (book)
  Angola, 407 (book), 740
  Belgian Congo, 1179 (book)
  East Africa, 406 (book)
  Finland (Porvoo island group), 1505*
  USA (Pacific States), 823 (book)
Flour mite (*Tyroglyphus farinae*), 590
Fodder-beet (*Beta vulgaris*)
  and sodium chlorate, 336
  and sugar-beet, comparison, 640
  boron content, 1563
  cultivation, 1025
  fertilizers, 1367, 1403, 1592
  in Netherlands, 1026
  nomenclature, 1025
    in Gt. Britain, 638
  spacing, 1367, 1403
  storage, 638, 829
  varieties, 1025
    Barres Øfofte....1592
    Corona....1403
    Eureka....1026
    Groeningia....1026
    Groenkraag C.B.....1026
    Groenkragen H.G.....1026
    Gulläker....1026
    Hollandia Groenkraag....1026
    Hunsballe X....1402
    Jaenschs Teutonia....176
    Ovana....176
    Pajbjerg Rex X....640, 1402, 1592
    Red Øtofte....1592
    Red Øtofte X....640, 1402
    Rex....1026
    Rosa Beta....1403
    Schreibers Grünkopfige....176
    Veni vidi vici....176
    Zentaur....1367, 1403
Fodder sorghum (*Sorghum vulgare*)—see Sorghum
Fodder sugar-beet—see Sugar-beet
Foliar diagnosis
  barley, 1146
  groundnuts, 601, 362, 601, 986
  peas, 1146
  potatoes, 1146
  sugar-beet, 1146
Foliar sprays
  maleic hydrazide, 1437
  potatoes, 1046
  sugar-beet, 633, 1046, 1390, 1398
  with micronutrients, 1332, 1601
Food production
  and sewage, 1156*
  in British Colonies, 1155
Foot rots
  Cercosporella herpotrichoïdes, cereals, 22
  Fusarium moniliforme, rice, 119
  Ophiobolus graminis, cereals, 21, 22
  wheat, 13
Formalin, 1536
4049, 87, 603
Foxtail (*Setaria* spp.), 1481
  S. lutescens (yellow), 1379
  S. viridis (green), 1379
France
  beans, 607
  buckwheat, 884
  cereal seed production, 128
  Jerusalem artichoke, 240
  linseed, 716
  maize, 72
    seed production, 551
  potatoes
    varieties, 651
    virus detection, 669
  rotations, 311
  wheat, varietal identification, 410 (book), 875
Frankliniella spp.—see Thrips
French Africa
  Morocco
    rice, 569
    sunflower, 1489
  North, cotton, 246, 1064
  Sudan
    agriculture, 1101, 1603
    land settlement, 453
    rice, 1101
    rotations, 453
    Serv. Agric. 1952, 1603
    sorghum, 1101
  tropical
    agricultural mechanization, 313

West
  Sansanding barrage, 1611
  Upper Nile Delta, irrigation, 1661
French Guiana, rice, 568
Frost damage, rape, 1491
Fumigants
  carboxide, 1440
  DD, 208, 662, 664, 665, 765, 828
  dichlorobutene mixture, 664
  Dowfume, 153, 664, 665
  ethylene dibromide, 208, 828, 1383
  Nemafume, 765
Fumigation, seed potatoes, 1438, 1439*
Fungicides
  Aagrano 350, 1346
  Agrosan, 119, 832
  approved for 1952, 383
  Arasan, 553, 660, 912, 1346, 1376, 1380, 1486
  BHC, 485
  Bordeaux mixture, 661, 1486, 1597, 1599
  C & C5400, 912
  calcium polysulphide, 490
  calcium sulphide, 486
  C.C.C. 228, 1346
  C.C.C. 5400, 1346
  Ceresan, 480, 1159, 1346, 1380
  compatability with herbicides and insecticides, 1161
  Cop-O-Zinc, 661, 1599
  copper, 1462
    oxide, 660, 1486
    sulphate, 507, 661
    + zinc + DDT, 1462
  Crag 658, 1599
  DD, 662
  development and use, 1181
  Dithane, 831, 1380, 1599
  Dow D.H.A., 1380
  electrostatic charges, 382
  F1003, 661
  Fermate, 660
  Granosan No. 1, 486
  in Canada, guide to, 1160
  in USA, 805*
  lime, hydrated, 660
  manganese ethylene bisdithiocarbamate, 661
  Mathieson 275, 1346
  mercuric chloride-iodide, 434
  Nomersan, 838
  Orthocide 406, 661, 912, 1346
  Parzate, 661
  Perenox, 202, 832, 1486
  Phygon, 993, 1350, 1376
  Premasan, 1349, 1350
  Puratized C-12-2525, 993
  R1038, 832
  Semesan 993, 1418
  Solusanigran, 1444
  Spergon, 67, 198, 660, 912, 1159, 1346, 1349, 1350
  SR-406, 1599
  Sulforon, 1190
  sulphur, 660, 838, 1462
  systemic, 340, 1572
  tests in Canada, 805*
  TMTD, 838
  Tritisan, 486
  Vancide 51, 912
  Zerlate, 185, 1014
  Zuieh, 1190
  1189, 661
Furcraea gigantea—see Aloe
Fusarium sp., potatoes, 660, 1036
F. moniliforme—see Foot rot
Fusarium wilt and chemotherapeutants, 1163
Galeopsis sp., 51
G. tetrahit—see Day nettle
Galinsoga sp.—see Quickweed
Galium tricorne, 1123
Gammexane, 584, 828, 838, 1576
Garlic (*Allium sativum*), 513
Geigy 33, 1576
General 7, 1122
Genite-923, 250
Germany
  cocklebur, oil-seed crop, 1062
  flax, 717
  flora of arable land, sociology, 1106
  Hohenheim wheat collection, 877
  ley farming, 748
  peas, 990*
  plant indicators, 1106
  rotations, 748
  seed potatoes, 196
  seed testing, 132
Germination, 1175 (book)
  and thermogenesis, 344
  barley, 480, 499, 899, 903, 1277, 1327
  cassava, 440
  chickpeas, 1140
  cotton, 1474
  cowpeas, 1140
  flax, 261, 1327
  giant foxtail (*Setaria faberii*), 770
  Gramineae, 1142*
  green gram, 1140
  groundnuts, 1197, 1602
  hemp, 1494
  in saline solutions, 345
  linseed, 1494
  maize, 372
    and sound-wave treatment, 920
    and temperature, 552
    cold test method, 83, 919
    stored seed , 1197
  mung, 1140, 1141
  oats, 480, 891, 1327
    in field and laboratory, 965
  peas, 605, 1140, 1141, 1349
  potatoes, 1414
  rice, 953, 1542
  Ricinus sanguineus, 1494
  sorghum, 1305
  soyabeans, 595
  sugar-beet, 1373
    and sound-wave treatment, 1007
  sweet corn, 1301
  Urena lobata, 1087
  weeds, 892
    and 2,4-D, 1126
  wheat, 20, 372, 478, 480, 499, 506, 1188, 1226, 1227, 1230, 1327
    osmotic pressure and dormancy, 479
  wild oats, 769
  witchweed, 1519
Gésarol, 249, 1576
Giant foxtail (*Setaria faberii*)
  germination, 770
  seed treatment, 770
Giant ragweed—see Ragweed
Giant scavenger water beetle (*Hydrous triangularis*), rice, 575
Gilia squarrosa—see Californian stinkweed
Glycine soja—see Soyabeans
Gold Coast
  cotton, 836
  Dep. Agric. Rep. 1950-1, 836
  jute, 1083
Golden nematode (*Heterodera rostochiensis*)—see Potatoes
Gossypium spp.—see Cotton
Grain sorghum—see Sorghum
Grain weevil (*Calandra granaria*), 590
Granosan No. 1, 486
Graphognathus peregrinus—see White-fringed beetle
Grasses and cereals, 413 (book)
Great Britain—see also United Kingdom
  agricultural production, 744
  agricultural research institutions, 1583 (book)
  agriculture, 745
   (poisonous substances), Regulations 1953, 1535
  barley, 411, 899
  Colon. Devel. Corp. Rep. 1952, 1593
  Commonw. Inst., 809
  Emp. Cott. Gr. Crop. Prog. Reps. 1950-1, 832
  England
    Berkshire, agriculture, 312
    Bristol, Long Ashton Agric. Hort. Exp. Sta. Rep. 1951, 895, 1187
    Cornwall, agriculture, 1092*
    Essex, Hasler and Co., Ltd. Rep. 1950-1, 1951-2, 426, 1594
    Kent, agriculture, 1496
    oat variety trials, 888
    Reading, Nat. Inst. Res. Dairy. Rep. 1953, 1592
    Rothamstead Exp. Sta. Rep. 1951, 828
  England and Wales
    agricultural education, 389
    cereal acreage by varieties, 126
    Minist. Agric. and Fish. Ryan Rep. 1951, 425
    oats, upland varietal trials, 889
  fertilizer practice 1944-50, 750
  fodder-beet, nomenclature, 638
  Imperial Inst., 809
  linseed, 726
  marginal land, 289, 1176 (book)
  mustard, 1492
  reclamation
    chalk land, 321*
    flooded land, 1502
  Scotland
    agricultural statistics, 751
    agricultural survey, 290
    agriculture, 751
    crop costs, 806, 1498
    Dep. Agric. Rep. 1952, 1595
    land improvement, 1595
    land use, 1595
    Scot. Pl. Breed. Sta. Rep. 1952, 1031
    seed certification, 1595
    seed potatoes, 195
    seed testing, 1595
  Wales
    Borth Bog, reclamation, 291
    rabbits, 387
    rural electrification, 390
  weeds, identification manual, 818
Greater convolvulus (*Calystegia sepium*), 1529

Greenbug (*Toxoptera graminum*)
  millet, 106
  wheat, 26, 493
Green cestrum (*C. parqui*), 1527
Green foxtail (*Setaria viridis*), 1009, 1190, 1379
Green gram (*Phaseolus radiatus*), 947
  germination, 1140
  seed treatment, 1141
Green manure(s)
  Acaciella laevis, 1522
  and cotton, 832
  and maize, 1513
    in S. Rhodesia, 542
  and rice, 1114
    and fertilizers, 962
  and wheat, 1114, 1249
  Beta patellaris, 181
  Cajanus indicus, 1249
  cassia, 838
  cowpeas, 110
  elephant grass, 832
  Guatemala grass, 832
  guinea grass, 832
  in Sierra Leone, 439
  in Southern Rhodesia, 1508
  in tropics, 1607
  legume leaves (wild), 1114
  lucerne, 1298
  lupins, 110, 1358
  millet, 943*
  Mimosa invisa, 167
  Mucuna deeringiana, 1513
  mustard, 1492
  rice, 838
  tree cassava, 838
Green mosaic, wheat, 493
Grey speck, oats, 895
Groundnut(s) (*Arachis hypogaea*), 1173 (book)
  agricultural requirements, review, 1344
  and *Bacterium radicicola*, inoculation, 983
  and cotton interplanted, 1605
  and 2,4-D, 1345
  and micronutrients, 984
  Aphis laburni, 600
  cultivation methods, 437
  diseases, 1173
  drying, 156, 157
  empty pod disease, 1347
  fertilizers, 601, 985, 987, 988, 989*, 1197, 1604, 1605
  floral biology, 154
  foliar diagnosis, 601, 986
  germination, 1197, 1602
  hairy caterpillar (*Amsacta albistriga*), 839
  harvesting methods, 1602
  in rotation, 453
  in Senegal, 742
  in Uruguay, 1195
  in USA, 1343
  micronutrients, 155
  morphology, 1173
  nutrition, 1173
  pests, 1173
  physiology, 1173
  pod formation, 154
  pseudonodulation induction, 1361
  Rhizobia, 1151
  rootworm (*Diabrotica undecimpunctata howardii*), 981
  rosette, 112, 600, 982*, 1198
  seed inoculation, 983, 1151
  seed rate, 112, 1606
  seed treatment, 440, 980*, 1197, 1346
  sowing date, 600, 1197
  spacing, 112, 437, 600, 978, 1606
  storage, 1602
  termites and thrips, 434
  topping, 979
  varieties, 600, 1197, 1604
    Dixie Runner....833
    Early Runner....833
    Gambia....112
    Holland Jumbo Runner....157
    Natal Common....437
    Spanish Bunch....437
    Valencia....437
    Virgina Bunch....437
    Virginia Runner....157
    24-5....983
    24-11....155, 983, 988
    28-206....983, 988
    28-207....453, 988
    42-94....988
  weeds in, 1345
Growth substances, 1131
  alpha-methylnaphthyl-methylether, 230
  alpha-naphthaleneacetic acid, 688
  alpha-naphthoxyacetic acid, 1163
  and flax, 1483
  and maize, 1296
  and sugar-beet seed and yield, 1375*
  beta-naphthoxyacetic acid, 1163
  ClIPC, 687, 1133
  2,4-D, 1133, 1163, 1390
  evaporation and activity, 1133
  heteroauxin, 731
  ICPA, 1556
  indole-3-acetic acid, 1163
  3-indolylacetaldehyde, 1143
  3-indolylacetic acid, 1144
  3-indolylacetonitrile, 1143, 1144
  IPC, 230, 1133
  maleic hydrazide, 231, 374, 677, 688, 1077, 1390, 1400, 1401, 1437 1552
  mechanism of action, 1557
  MENA, 686
  N-2,4-dichlorophenyl succinimide, 778
  p-aminobenzoic acid, 1484
  penicillin, 787
  phenylurethan, 230
  Rindite, 1415
  role of, 430
  Rootone, 440
  Seradix B, 1073
  sulphanilamide, 1484
  2,4,5-T, 688
  TCNB, 230, 686
  2,3,5-tri-iodobenzoic acid, 1163, 1442
Gryllulus desertus, millet, 106
Guatemala grass, green manure, 832
Gueserol 550, 701
Guinea corn (*Sorghum vulgare*), fertilizers, 1604
Guinea grass, green manure, 832
Gummosis in sugar-beet, 182
Hairy caterpillar (*Amsacta albistriga*), groundnuts, 839
Hairy indigo (*Indigofera hirsuta*), 1151
Halotydaeus destructor—see Red-legged earth mite
Handy-Killer, 215
Harmolita spp.—see Joint worm
Hawaii, nickel in plants, 1562
HCH—see BHC
Helianthus annuus—see Sunflower
H. tuberosus—see Jerusalem artichoke
Heliothis armigera, 88, 249, 277, 730*, 1290
Helminthosporium carbonum—see Leaf spot
H. maydis—see Southern leaf blight
H. sativum, wheat, 23, 61, 1599
H. turcicum—see Northern leaf blight
Hemp (*Cannabis sativa*)
  and ultrasonic sound waves, 780
  germination, 1494
  in USA
    Kentucky, 1081
    Wisconsin, 1081
  in USSR, 1082
  nutrition, 262
  root rot (*Sclerotium rolfsi*), 1010
Heptachlor, 1383, 1464
Herbanit, 723
Herbasol, 723
Herbatox, 352, 723
Herbex, 6, 276
Herbicide(s), 340, 1129
  aerial spraying, 1125
  Agroxone, 276, 352, 721, 999, 1130, 1232, 1533
  Ammate, 1128
  and barley, 1601
  and bees, 1135
  and cereals, 586
  and flax, 1079
  and linseed, 1601
  and maize, 924
  and oats, 1601
  and plant surfaces, 342
  and potatoes, 672
  and soil micro-flora, 434
  and soyabeans, 596
  and sweet corn, 1191
  and wheat, 483, 1601
  and woody plants, 1128
  approved for 1952, 383
  aromatic oils, 773
  bacterial breakdown, 803
  beta-naphthoxyacetic acid, 1601
  Borasan, 1127
  borax, 179
  calcium cyanamide, 337, 1123, 1191, 1231, 1416, 1600
  calcium nitrate, 158
  4-chlorophenoxyacetic acid, 1601
  Chloroxone, 434
  C1IPC, 339, 430, 596, 704, 834, 1008, 1009, 1378, 1601
  CMU, 334, 430, 692, 704, 834, 924, 1191, 1122, 1127, 1416, 1530, 1531, 1600, 1601
  compatability with fungicides and insecticides, 1161
  composition and effect, 1129
  copper preparations, 1381
  copper sulphate, 434, 723
  Crag Herbicide No. 1, 597
  2,4-D, 34, 51, 52, 91, 92, 93, 104, 116, 133, 134, 219*, 323, 352, 484, 513, 534, 573, 585, 586, 596, 648, 678, 692, 728, 766, 767, 768, 771, 774, 834, 879, 893, 896, 921, 922, 923, 975, 1039, 1072, 1120, 1122, 1127, 1128, 1130, 1132, 1162, 1181, 1182, 1190, 1191, 1195,

  1330, 1345, 1481, 1524, 1526, 1532, 1600, 1601
  DCP, 834
  DCPA, 434, 1181
  DD, 335
  Denocate, 434
  development and use, 133
  dichloral urea, 430, 1378, 1416
  Dicopur, 52
  Dicotox, 352, 440, 723, 1232
  Dinitros, 1600, 1601
  DINOC, 442
  DNBP, 133, 158, 829, 1079, 1130
  DNOC, 133, 158, 215, 276, 339, 721, 773, 829, 1079, 1330
  DNOSBP, 150, 596, 597, 602, 647, 692, 704, 834, 1191, 1345, 1533
  Dow, 647, 692, 834, 992
  Dowcide G, 597
  Dowspray 66 improved, 215
  Endothal, 430, 1009, 1377, 1378
  evaluation test, 1191
    Lemna, 341
  Fernoxone, 839, 1232
  General 7, 1122
  Handy-Killer, 215
  Herbanit, 723
  Herbasol, 723
  Herbatox, 352, 723
  Herbex 6, 276
  Hexamul, 1125
  in Canada, guide, 1160
  in India, 1607
  in Sweden, 1534
  IPC, 834, 1008, 1009, 1130, 1377, 1378, 1533, 1601
  kainit, 337, 1123
  4K-2M, 51, 276, 352, 534,
  KOCN, 596
  Lion Oil 339, 834
  maleic hydrazide, 160, 430, 596, 635, 1190, 1391, 1600, 1601
  MCPA, 34, 104, 116, 133, 134, 275, 323, 332, 430, 484, 584, 728, 764, 766, 767, 768, 829, 879, 893, 992, 1079, 1190, 1120, 1130, 1132, 1181, 1190, 1330, 1481, 1525, 1533, 1601
  Methoxone, 35, 434, 586, 1607
  monoethanolamine arsenite, 1573
  M-type hormone, 723
  N-1-naphthylphthalamic acid, 430, 1601
  nitrochalk, 1231
  octachlorocyclohexanone, 1601
  PCP, 596, 704, 773, 1601
  Penn salt Np-128, 597
  pentachlorophenol, 1377
  phenoxyacetic acid, 776
  Phenoxyl, 434
  phytocidal index, 341
  phytotoxicity, 352
  PMA, 596
  Premerge, 992, 1416
  selective action, 1131
  SES, 596, 1601
  SESIN, 1601
  Shell Weedkiller, 1522
  Sinox General, 215, 647, 1416
  Sinox PE, 924
  sodium arsenate, 314, 647, 1127, 1573
  sodium chlorate, 323, 324, 336, 771, 1127
  sodium chloride, 1377
  sodium 2, 4-dichlorophenoxyethyl sulphate, 1416
  sodium isopropyl xanthate, 1601
  sodium methyl-chlorophenoxy-acetate, 724
  sodium nitrate, 1377
  Sulfasan, 597
  2,4,5-T, 116, 205, 776, 922, 1120, 1128, 1130, 1182, 1524, 1600
  TCA, 335, 596, 728, 834, 922, 1009, 1122, 1127, 1130, 1190, 1378, 1379, 1416, 1481, 1533, 1600, 1601
  trichloracrylate, 1601
  trichlorobenzoic acid, 1601
  U46, 802
  Weedone 40, 440
Hessian fly (*Phytophaga destructor*), wheat, 492
Heterodera glycines—see Soyabeans
H. major—see Oats
H. marioni—see Potatoes
H. rostochiensis—see Potatoes
H. schachtii—see Beet eelworm
Hexamul, 1125
Hibiscus cannabinus—see Kenaf and Wild stokroos
H. kitaibelifolius—see Wild stokroos
H. masterianus—see Wild stokroos
H. sabdariffa—see Roselle
Hoary cress (*Lepidium* spp.), 1601
Hoary pepperwort (*Cardaria draba*), 771, 1525
Honey sorghum (*Sorghum vulgare*)—see Sorghum
Hordeum spp.—see Barley
Horse beans (*Vicia faba*)—see Beans
Horse gram (*Dolichos biflorus*), 755, 839
Horsetail (*Equisetum* sp.), 1127
Hulga (*Dolichos biflorus*)—see Horse gram
Hungary
  Pussta, salt-resistant crop plants, 1097
  weeds, 1136
Hydroponics, 420
Hydrous triangularis—see Giant scavenger water beetle
Hylemyia spp.—see Seed corn maggot
Hypericum perforatum—see St. John's wort
Hypogymna morio on cereals, 968
ICPA, 1556
Imperata cylindrica—see Cogon
India
  Bombay, water conservation, 755
  Coleus parviflorus, 1607
  cotton, 245
  Deccan, dry farming, 1509
  Delhi. Bd Agric. Anim. Husb. Proc. 1950, 1607
  food crops, 1607
  herbicides, 1607
  Karnatak, dry farming, 1509
  Madras
    cotton, 1455, 1456
    Dep. Agric. Admin. Reps. 1941-48, 1949-50, 1950-51, 441,* 839
    pulses, 616
    rice breeding, 839
  rice, 958
    and fertilizers, 1250
  seed potatoes, 657*
  weeds, 1607
  wheat and fertilizers, 1250
Indigofera endecaphylla, 1151
I. hirsuta—see Hairy indigo
I. pentosa, 1151
I. suffruticosa, 1151
Indole-3-acetic acid, 1163
3-indolylacetaldehyde, 1143
3-indolylacetic acid, 1144
3-indolylacetonitrile, 1143, 1144
Insecticide(s), 388
  aerial spraying, 1125
  Aldrin, 252, 372, 377, 553, 705, 828, 1383
  and bees, 257, 828
  and biological activity, 1610
  and cotton, 707*
    pests, 1173*
  and potatoes, flavour, 1597
  and soil bacteria, 802
  approved for 1952, 383
  Aramite, 250
  Bexadust, 801
  BHC, 252, 612, 705, 714, 799, 801, 828, 830, 832, 836, 839, 1047*, 1059, 1453, 1470
  Caffaro dust, 1576
  calomel dust, 186
  carbon tetrachloride, 591
  Chlordane, 252, 257, 828, 1011
  chloropicrin, 591
  compatibility with fungicides and herbicides, 1161
  DDT, 27, 88, 249, 251, 252, 257, 277, 434, 555, 575, 603, 705, 706, 708, 800, 802, 828, 830, 832, 836, 1059, 1289, 1302, 1335, 1453, 1470, 1576
    in carbon tetrachloride, 90
  Dieldrin, 252, 257, 372, 377, 553, 705
  diethoxythiophosphoric acid ester of 2-ethyl mercaptoethanol, 159
  Dorytox, 1125
  dusts, 1253
  E 605, 802
  electrostatic charges, 382
  Endrin, 1290, 1471*
  EPN, 250, 377, 705, 706, 1472*
  Etilon, 1424
  Gammexane, 584, 828, 838, 1576
  Geigy 33, 1576
  Genite-923, 250
  Gésarol, 249, 1576
  Gueserol 550, 701
  handbook, 1591
  Heptachlor, 1383, 1464
  in Canada, guide, 1160
  Isodrin, 1290
  Lindane, 553, 1575
  Malathon, 705
  Metacide, 1291
  Methoxychlor, 553, 1289
  nicotine sulphate, 801
  octamethyl, 603
  octamethylpyrophosphoramide, 250, 705
  organic, synthetic, 1181
  Ovotran, 250
  Parathion, 26, 250, 375, 603, 705, 830, 1059, 1424
  Pestox, 708, 1374, 1424
  plant absorption, translocation, 353
  residues
    of 4049, 87
    on crops, 381

  - Sulphenone, 250
  - sulphur dust, 250
  - systemic, on plants, 804
  - Systox, 250, 376, 705, 1374
  - TDE, 706
  - thiophosphate, 612
  - TM 269, 377, 705
  - Toxaphene, 252, 257, 377, 705, 706, 708, 828, 1335, 1386
  - toxicity studies, 377
  - Toxin p, 1576
  - 3-5-40, 257
  - 4049, 87, 603
- Insect pests, British Commonwealth, 826 (book)
- Internal cork, sweet potatoes, 1441
- International agricultural organizations, 445
- International publication exchange, 813
- *Inula graveolens*—see Stinkwort
- Iodine, radioactive, 1556
- IPC, 230, 834, 1008, 1009, 1130, 1133, 1377, 1378, 1533, 1601
- *Ipomoea batatas*—see Sweet potatoes
- Ireland
  - Northern
    - agriculture, 1094
    - fertilizers, 1094
    - Minist. Agric. Rep. 1951, 427
    - small farms, 1095
  - Republic of
    - land rehabilitation project, 428
    - Minist. Agric. Rep. 1950-1, 428
- Iron
  - absorption
    - barley, 1317
    - rice, 1317
  - deficiency
    - in plants, and enzyme activity, 1564
    - oats, 1261
- Irrigation
  - barley, 70
  - cotton, 832, 1024*
    - in Egypt, 1586
  - crops, 752
  - in Italy, 316
  - in Netherlands, 302
  - in S. Africa, 1507*
  - in USA, 817, 1111
  - in USSR, 1109, 1110*, 1501
  - maize, 308
  - oats, 308
  - overhead
    - barley, 527, 753, 828
    - potatoes, 753, 828
    - sugar-beet, 753, 828
  - potatoes, 650, 1406
  - rice, 111, 569, 1306
  - sprinkler
    - -fertilizer, 317
    - in Italy, 315, 1112*, 1113
    - in Netherlands, 303
    - sugar-beet, 1024*, 1399
  - sugar-beet, 1399
  - sunflower, 282
  - time prediction, 309
  - Upper Nile Delta, 1611
  - wheat, 5, 37, 476, 883, 1218, 1219
    - in Ukraine, 867
- *Isachne australis*—see Batadella
- *Ischaemum rugosum*, 954
- Iscobrome II, 1536
- Isodrin, 1290
- Italy
  - chickpeas, 1357
  - fertilizer-irrigation, 37
  - irrigation, 316
  - land reclamation, 1096
  - maize, 77, 1281*
  - plants and seed introduced 1951, 914
  - sprinkler irrigation, 315, 317, 1112*, 1113
  - sugar-beet
    - in the hills, 622
    - mechanization, 1362
    - pests, 1387
  - wheat in mountains, 464, 470
- **J**ack bean (*Canavalia ensiformis*), 1151
- Japan
  - agro-ecological regions, 409 (book)
  - barley after rice, 1270
  - rice classification, 1311
- Jassids, cotton, 701
- Jerusalem artichoke (*Helianthus tuberosus*)
  - flower and tuber formation, 829
  - in France, 240
- Job's tears (*Coix lachryma-jobi*)
  - bird-resistant variety, 121
  - chemical composition, 121
  - in Brazil, 121
  - leaf blotch (*Curvularia* sp.), 122
  - seed rate, 963
  - sowing date, 963
  - spacing, 963
- Johnson grass (*Sorghum halepense*), 329, 334, 430, 1601
- Joint worm (*Harmolita* spp.), wheat, 1602
- Jute (*Corchorus* spp.)
  - *C. capsularis*, 1083, 1485
    - photoperiodism, 439, 1084
    - seed rate, 263
    - spacing, 263
  - *C. olitorius*, 1083, 1485
    - photoperiodism, 439, 1084
    - seed rate, 263
    - spacing, 263
    - var. ECR576....1083
  - in Gold Coast, 1083
  - seed drill, 263
  - sowing method, 1485
  - spacing, 1485
  - stem rot (*Macrophomina phaseoli*), 1486
  - substitute fibres, 412 (book)
- **K**affir corn (*Sorghum vulgare*) 564
- Kainit, 337, 1123,
- Kalai—see Mung
- Kale
  - and copper, 1187
  - hungry-gap, 1445
  - marrow-stem, 1445
    - chemical composition, 1592
    - fertilizers, 1592
    - seed production, 1445
    - spacing, 1445
    - storage, 1445
      - in clamps, 1445
  - Siberian, 1445
  - thousand-headed, 1445
    - chemical composition, 1592
    - fertilizers, 1592
- Kans grass (*Saccharum spontaneum*), 327, 1520, 1607
- Kenaf (*Hibiscus cannabinus*)
  - botany, cultivation and processing, 412
  - fertilizers, 1085, 1086
  - in Florida, 1086
  - in Mauritius, 1085
  - in New Guinea, 841
  - in Papua, 841
  - photoperiodism, 266
  - priming, 1604
  - seed rate, 266
  - sowing date, 1085, 1086
  - spacing, 267, 1085
  - varieties, 1086
- Kenya
  - Afr. Land Util. Settlem. Rep. 1952, 1199
  - cereals, 862
  - soil and water conservation, 1199
- Khesari—see *Lathyrus sativus*
- Kidney bean (*Phaseolus vulgaris*)—see Beans
- 4K-2M, 51, 276, 352
  - bacterial utilization, 534
- KOCN, 596
- Krilium, 404, 447, 1582*
- **L**aemophloeus spp.—see Flat grai beetle
- Lakh—see *Lathyrus sativus*
- Lalang grass (*Imperata cylindrica*)—see Cogon
- Lambsquarters (*Chenopodium alba*), 772, 893, 992, 1232, 1530
- Land
  - improvement in Scotland, 1595
  - marginal
    - chalk reclamation, 321*
    - in Gt. Britain, 289, 1176 (book
  - reclamation
    - colonizer plants, 760
    - in Germany, 760
    - in Great Britain
      - marginal chalk, 321*
      - Wales, bog, 291
    - in Ireland (Republic), Rehabilitation Project, 428
    - in Italy, 1096
    - in Netherlands, 301, 305, 306*
      - heathland, 303
      - peat soils, 304
      - saline, 299, 300
    - in Surinam, 314
  - salt-water flooded, 1502
  - settlement in French Africa, Sudan, 453
  - use, 1608
      - in Norway, 824
      - in Oregon, 1517
      - in Scotland, 1595
      - world, 1090
- Lang—see *Lathyrus sativus*
- *Laphygma exigua*
  - maize, 1012
  - sugar-beet, 1012
  - sunflower, 1012
- Late blight (*Phytophthora infestans*) potatoes, 202, 204*, 661, 1034 1035, 1597, 1599
- Lathyrism, 165
- *Lathyrus ochrus*
  - seed dormancy, 1000
  - seed size, 1000
  - seed treatment, 1000
- *L. sativus*
  - catch crop in Germany, 845
  - selenium content, 165
  - var. Indore T.2-12....164
  - wilt, 164

Latvia, potato storage, clamps and cellars, 683
Leaf anthracnose (*Colletotrichum graminicolum*), sorghum, 105
Leaf blotch (*Curvularia* sp.), Job's tears, 122
Leaf curl, cotton, 416
Leaf roll, potatoes, 680, 1419, 1422
Leaf roller (*Sylepta derogata*), cotton, 1470
Leaf rust (*Puccinia graminis*), wheat, 10
Leaf spot
  Cercospora sp., 1597
  C. beticola, sugar-beet, 1369, 1381, 1382
  Helminthosporium carbonum, maize, 84
Leaf worm (*Alabama argillacea*), cotton, 377, 1068
Leafy spurge (*Euphorbia esula*), 1601
Legumes
  and cereals, 1533
  in agriculture, 1585 (book)
  nodulation, 614
  seed production, 1585
Leguminosae
  nodule degeneration, 40
  nodule pigmentation, 364
Lemna test for herbicide evaluation, 341
Lentil(s) (*Lens* spp.)
  German nomenclature, 611
  morphology, 611
  seed storage, 1576
  seed treatment, 1576
  selenium content, 165
  systematics, 611
Lepidium spp.—see Hoary cress
Leptinotarsa decimlineata—see Colorado beetle
Lesser grain borer (*Rhizopertha dominica*), 590
Ley farming, 460, 748, 1108
Light and plant growth, Finland, 793
Lima bean (*Phaseolus lunatus*), 1151
Linaria sp., 1600
L. vulgaris—see Toadflax
Lindane, 553, 1575
Linseed (*Linum usitatissimum*)
  and 2,4-D, 728, 1533
  and herbicides, 1601
  and heteroauxin, 731
  and MCPA, 275, 728, 1533
  and Methoxone, 35
  and sodium chlorate, 336
  and TCA, 728
  boron content, 1563
  continuous cropping, La Plata, 727
  fertilizers, 726, 1055, 1488
  flea beetle, 726
  germination, 1494
  Heliothis armigera, 277, 730*
  in Brittany, 716
  in England (E. Anglia), 726
  in Queensland, 273*
  in USA, 1053
  in USSR, 1078
  Linum spp., 407
  oil extraction, laboratory method, 732
  rust (*Melampsora lini*), 729
  seed production, 1488
  sowing date, 726
  spacing, 726
  varietal characters, 274
  varieties, 275, 716, 1053
    B5128....829
    Bison....274, 1054
    Buck 3....727
    Calar....442
    Canadian Royal....1604
    Concurrent....1482
    Dakota....274, 426, 1054
    Entre Rios....727
    Klein II....727
    La Previsión 18....727
    Lin Ameliore....442
    Minerva....274, 829
    Moroccan....274
    P330 M.A....727
    Plate 115....442
    Población Facultad....727
    Punjab....838
    Querandi M.A....727
    Redwing....274, 1054
    Redwood....1054
    Robert 0-1....829
    Rocket....274, 829, 1054
    Royal....274, 726, 1054
    Sadd's English....274
    Sheyenne....274, 1054
    Uruguay....442
    Vaanila....274
    Valuta....274, 426, 829
    Victory....1054
    Viking....1054
    Walsh....442
    Zona Buenos Aires....442
    2162-A....829
  weeds in, 276, 728, 824, 1190, 1533
Linum spp., 407
L. usitatissimum—see Flax for fibre, Linseed for oil
Lion oil, 339, 834
Lithuania, potatoes, storage clamps and cellars, 683
Locusts, aerial control, 386*
Loose smut—see Smuts
Lubia—see *Dolichos lablab*
Lucerne (*Medicago* spp.)
  and smog, 794
  and toxic gases, 795
  fertilizers, 522
  manganese deficiency, 671
  oxalate content, 1559
  var. Kamalinsk 930....812
Lupin(s) (*Lupinus* spp.)
  boron content, 1563
  inoculation experiments, 149
  L. albus
    as green manure, 110
    lime chlorosis, 1188
    oxalate content, 1559
    seeds, chemical composition, 1358
    shoot morphogenesis, 347
  L. angustifolius
    fertilizers, 1359
    magnesium requirement, 1359
    seeds, chemical composition, 1358
  L. luteus, 303
    as green manure, 1358
    fertilizers, 1358
    seeds, chemical composition, 1358
    vernalization, 1329
  sweet, vernalization, 1329
  varieties, 615, 1205
  weather requirements, 168
Lupinus spp.—see Lupins
Lygus spp. on cotton, 1198
L. elisus on cowpeas, 1335
L. hesperus on cowpeas, 1335
L. vosseleri on cotton, 1469
Lysimeters, 1355
Macrophomina phaseoli—see Stem rot
Macrosiphum pisi, 159, 603, 1351
Madagascar. Lake Alaotra Agric. Sta. Rep. 1949-50, 440
Magnesium requirement, lupins, 1359
Maize (*Zea mays*)
  amino acid content, 927
  and Aldrin, 372
  and catch crops in Netherlands, 543
  and CMU, 1531
  and cover crops, 757
  and cowpeas interplanted, 1604
  and 2,4-D, 91, 92, 93, 430, 431, 923
  and Dieldrin, 372
  and green manures, 1513
    lucerne, 1298
  and growth substances, 1296*
  and herbicides, 924, 1191
  and Krilium, 404
  and terramycin, 787
  and ultrasonic sound waves, 780
  bacterial leaf blight (*Pseudomonas alboprecipitans*), 84
  bird resistant hybrids, 546
  bitter varieties, 78
  borer-degree days, 556
  calcium deficiency, 1294
  carotene content, 97*
  cassava intersown, 1197
  C^{14} distribution, 1295*
  chinch bug (*Blissus leucopterus*), 1293
  corn earworm (*Heliothis armigera*), 88, 1291, 1302
  corn rootworm (*Diabrotica longicornis*), 1292
  corn stalk borer (*Sesamia* sp.), 836
  drought resistance, 1285
  drying equipment, Netherlands, 101
  drying with heated air, 932, 934
  drying with unheated air, 933, 935
  ear length and yield, 1193
  European corn borer (*Pyrausta nubilalis*), 86, 87, 556, 1285, 1289
  fertilizers, 438, 1197, 1513, 1604, 1605
  genetic catalogue, 1282*
  germination, 372
    and sound-wave seed treatment, 920
    and temperature, 552
    cold test methods, 83, 919
    stored seed, 1197
  green manuring, S. Rhodesia, 542
  harvest date prediction by degree-hour method, 937
  harvesters, S. Africa, 100
  heteroses, 549
  history, 545*
  husk cover and weevil damage, 89
  in Belgium, 73, 74
  in Europe, 550
  inflorescence, 1297*
  in France, 72
  in Indiana, 1284*
  in Italy, 77, 1281*
  in Mexico, 918
  in Netherlands, 75
  in North Africa, 550
  in Nyasaland, 81

  in Queensland (S. Burnett), 907
  in rotation, 442, 1519
  in S. Africa (Highveld region), 916*
  in Switzerland, 76
  intercropped, 757
  interplanted with cotton, 242, 1606
  irrigation, 308
  Laphygma exigua, 1012
  leaf composition as varietal character, 926
  leaf spot (*Helminthosporium carbonum*), 84
  locust-resistant, 78
  maturity and sulphur treatment, 941
  maturity test for canning, 938
  niacin content, 96
  nicotinic acid content, 97*
  northern leaf blight (*Helminthosporium turcicum*), 84
  nutrition, 930, 931
  origin, 545*
  pantothenic acid content, 96
  phosphorus absorption by foliage, 784
  phosphorus recovered from lucerne residues, 1298
  photoperiodic treatment, 559, 1287
  plant maturity index, 86
  pollen viability test, 94
  pollination changes, 560
  popcorn, artificial drying, 1299*
  protein analysis, 928
  protein content, 95, 96
  radioactive phosphate assimilation, 1148
  rice weevil (*Sitophilus oryzae*), 925
  root
    sodium excreted by, 1188
    system, 99
  rough dwarfing, 558
  rust (*Puccinia polysora*), 439, 554*
  seed absorption of 2,4-D, 921
  seed anatomy, 98
  seed growth, 1296*
  seed production in France, 551
  seed storage, 553
  seed treatment, 440, 507, 553, 912, 920, 1288, 1542
  shade for cotton, 242
  Shimbu, 1197
  smut, 1195
  southern cornstalk borer (*Diatraea crambidoides*), 1290
  southern leaf blight (*Helminthosporium maydis*), 84
  sowing date, 438, 1197, 1606
  sowing immature seed, 1288
  spacing, 242, 438, 912, 1197, 1606
  stalk borer, 85*, 555
  stem borer, 1604
  Stewart's wilt (*Bacterium stewartii*), 84
  stolon-producing form, 1286
  storage, 557, 1197
    in bags, 90
    in USA, 561
  sucrose in stalk, 929
  sweet corn
    and herbicides, 1191
    corn earworm, 940*, 1302
    endosperm cracking, 939
    fertilizers, 1300
    germination, 1301
    in USA, 936
    kernel damage, 939
    mechanical harvesting, 939
    planting depth, 1301
    spacing, 1300
    varieties, 936
      Early Golden....1300
  tassel ratio, 86
  temperature and growth, 1287
  thiamine content, 97*
  tillage and yields, 747
  topping, 437
  two generations in one season, 1288
  varieties, 437, 438, 583, 911*, 912, 916*, 917*, 1197, 1283, 1284, 1285, 1596, 1602, 1606
    A.H. IFI....839
    Bessarabka....79
    Bianco Perla....82
    Borjba....79
    Bukovinskiĭ....79
    C.103....929
    C.I.V.1....73
    C.I.V.2....547
    C.I.V.7....547
    Double Hybrid....1605
    Eagle Hill....913
    Embro 155....195
    Ensign....442
    Étoile de Normandie....926
    Fitzroy....442
    Funk's G 19....82, 908
    Funk's G 114....908
    G.H. 96A....442
    G.H. 112A....442
    G.H. 134....442
    Golden Bantam....938
    Golden Cross Bantam....1300
    Goudster....73, 75, 547
    Hickory King....81, 1605
    Indiana 750A....915
    Insubria 1....82
    Insubria 2....82
    Insubria 133....548
    Insubria 524....548
    Iowa 4316....82, 908
    Kärntner....76
    King's Krost....82
    Macario....544
    Manalta....913
    Marano Vicentino....82
    Maygold 49....82, 908, 915
    Maygold 99....82
    Maygold 99A....908, 915
    Mich. 20D....909
    Mich. 29D....909
    Mich. 250....80
    Mich. 350....80, 909
    Mich. 480....909
    Namalenga....81
    N.E.H. 17....442
    N.E.H. 18....442
    Nodak 301....547
    North Dakota....79
    Nostrana dell' Isola....76, 99, 544
    Ohio C.92....82
    Ohio M.15....544
    Okla. 301....910
    Pfarrkirchner....913
    Pioneer 340, 544
    Potchefstroom Pearl....81, 1287, 1296
    Prerauer....76
    Regal....442
    Sahara....81
    Scagliolo 23A....544
    Scagliolo Gigante....544
    Southern Cross....81
    Standfast....442
    Station Reid Yellow Dent....5
    Sunrise....442
    U.32....99, 544, 908
    U.41....908, 915
    United 28....73
    U.S. 13....82, 544, 908
    U.S. 13FI....839
    Victory....442
    Voronežskaja 76....79
    W22....93, 923
    W1600....913
    W22 × M14....93, 923
    WF9....93, 923
    WF9 × Os420....93, 923
    Wis. 240....72, 547
    Wis. 255....544, 547
    Wis. 275....73
    Wis. 464....544, 908
    Wis. Hybrid 595....91
    Zubovidnaja 3135....79
  vernalization, 1287
  water requirements, 1518
  weeds in, 339, 772, 922, 924, 1192
  weevil, 557*
  witchweed in, 1519
  world production, 1584
  yield and ear length, 1193
Malathon, 705
Maleic hydrazide, 231, 430, 1400, 140
1437, 1552, 1600, 1601
  and beans, 163
  and cotton, 1077
  and peas, 160
  and potatoes, 231, 677, 688
  and soyabeans, 596, 688
  and sugar-beet, 635, 1190, 1390, 13
  as anti-auxin, 374
Manganese
  and cotton, 1475
  deficiency
    in clover, 671
    in lucerne, 671
    in oats, 514, 515, 895, 1187
    in potatoes, 514, 671
    in soyabeans, 1193
    in sugar-beet, 830
    in wheat, 1193
  ethylene bisdithiocarbamate, 661
  in crop production, 359*
  sulphate
    and oats, 514
    and potatoes, 514
Mangel(s) (*Beta vulgaris*)
  fertilizers, 640
  harvesting date, Denmark, 639
  nomenclature, 1025
  storage, 684
  varieties, 1025
    Barres....639
    Barres Øtofte X....640
    Yellow Globe....640, 1592
Manihot spp., 700
M. utilissima—see Cassava
Manures and fertilizers, 816 (book)
Map, ecological, Argentina, 1177 (boo
Marginal land, 289, 321*
  in Gt. Britain, 1176
Matki (*Phaseolus aconitifolius*), 755
Matricaria inodora, 892
Mauritius, kenaf, 1085
MCPA, 104, 133, 323, 332, 430, 58

        764, 766, 767, 768, 829, 893, 992, 1120, 1130, 1181, 1190, 1330, 1481, 1525, 1601
  and barley, 879, 970
  and flax, 829, 1079, 1533
  and linseed, 275, 728, 1533
  and oats, 879, 970
  and rice, 116
  and wheat, 34, 484, 879, 970
  toxicity studies, 1132
Mechanization in USSR, 1186
Medicago denticulata, 1232
M. hispida, oxalate content, 1559
Melampsora lini—see Rusts
Melampyrum arvense, 1123
Melicleptria scutosa, millet, 106
Melilotus spp.—see Clover
Meloidogyne spp.—see Root knot nematode
Melolontha vulgaris—see Cockchafer
MENA, 230, 686
Mercuric chloride-iodide, 434
Metacide, 1291
Methoxone, 586, 1607
  and cotton, 434
  and linseed, 35
  and mustard, 35
  and peas, 35
  and wheat, 35
Methoxychlor, 553, 1289
Mexican poppy (*Argemone mexicana*), 287
Mexico
  agriculture, 297
  maize, 918
Micronutrient(s)—see also individual minor elements
  and groundnuts, 155, 984
  and oats, 516
  and sugar-beet, 1187
  content in potatoes, 674
  determination in plants, 786
  dusts, added to 2,4-D, 1601
  foliar sprays, 1332, 1601
  in seed treatment for drought-resistance, 482
Middle East, scientific papers published 1950-1, 393
Millet(s)
  catch crop in Germany, 845
  Chloridea dipsacea, 106
  green manuring, 943*
  Gryllulus desertus, 106
  in rotation, 453
  Melicleptria scutosa, 106
  Panicum miliaceum (proso), seed treatment, 566
    spacing, 942
  Pardilens calceatus, 106
  Pennisetum spp.
    fertilizers, 944*
    in Senegal, 742
    ridge size, 838
  Phyllotreta atra, 106
  P. vittula, 106
  rice weevil, 838
  Setaria italica (Italian), 106
    greenbug, 106
    seed rate, 103
    varieties,
      Cjurupinskaja 22....103
      Dai-baĭ-ču....103
      Lisoboĭ-Antohuan....103
      Nju-to-gou....103
      Sjao-baĭ-ču....103
      Sjao-hun-ču 41....103
      Ukrainskaja 38....103
      Veselopodoljanskoe 367....103
    storage, 838
    Toxoptera graminum, 106
    Trigonotylus ruficornis, 106
    varieties, 1205
Mimosa invisa as green manure, 167
Minor elements—see Micronutrients
Moisture equilibrium curves, 398
Molybdenum
  and peas, 606
  deficiency
    plant and soil factors, 1147
  in cotton, 1476
Monoethanolamine arsenite, 1573
Monosodium cyanamide, 1354
Morocco
  rice quality, 952
  wheat, 1217
Mosaic
  peas, 603
  potatoes, 1422
M-type hormone, 723
Mucuna cover crop, 1513
M. deeringiana as green manure, 1513
Mulch(es)
  and soil fertility, 438
  cotton, 832, 1197
  elephant grass, 758, 832
  penetration by rain water, 758
  soil drying effect, 758
  sower, 757
  stubble ploughing, 747
Mung (*Phaseolus mungo*), germination, 1140
Mustard
  and Methoxone, 35
  as green manure, 1492
  Brassica arvensis, 1190
  B. juncea, 992
    oil content, 285
    varieties
      Trowse....842
      Trowse Black....1492
  B. kaber, 1126
  B. nigra (brown), 842
  growth and water-table, 1544
  in Gt. Britain, 1492
  seed production, 1492
  Sinapis alba, 842
    boron content, 1563
    boron deficiency, 1563
    cross-pollination, 1061
    fertilizers, 286
    in Denmark, 286
    seed rate, 286
    sowing date, 286
    spacing, 286
  varieties, 842
  wild, 1126, 1190
Myzus persicae, potatoes, 679, 681, 690
NAAS, Ryan Report, 425
N-2, 4-dichlorophenyl succinimide, 778
Nemafume, 765
Nematode(s)
  Belonolaimus gracilis, cotton, 1468
  Ditylenchus dipsaci, oats, 894
  Heterodera major, oats, 894
  Meloidogyne spp. , host range, 1384
  M. incognito var. *acrita*, 1467
Nephotettix bipunctatus, rice, 839
Neslia paniculata, 1123
Netherlands
  agriculture, 294, 1500*
  barley, 59
  Cent. Inst. Agric. Res. Rep. 1951, 829
  cereals, 413
  Comm. Bevord. Suikerbietenteelt Noord. Prov. 1951, 830
  cropping plan, 310
  crop yields, 843
  drainage, 302, 304, 305
  field crop variety list 1952, 395*
  fodder-beet, 1026
  irrigation, 302
  laboratory accuracy, 1579
  land reclamation, 301, 303, 305, 306*
  maize, 75, 101
  marine land cultivation, 301
  Nat. Cttee Malt. Barley 16th Yearb. 1952, 831
  peas for canning, 1348
  potatoes, 643, 649, 682
  rye, 303
  saline soils and cropping, 299, 300, 301
  soil and water conservation, 305, 1116, 1503*
  sprinkler irrigation, 303
  sub-irrigation, 302
  sugar-beet,
    diseases and pests, 820
    virus yellows, 632
  turnips, 1404
    development during growth, 1027
  weeds, identification, 761, 762
New Caledonia, agriculture, 743
New Guinea, kenaf, 841
New Zealand
  Dep. Census and Statist. Yearb. 1950, 443
  Dep. Sci. Industr. Res. Rep. 1952 1202
  plant diseases, 384, 1571
  varietal trials, 1202
Nickel
  and oats, 1261
  in Hawaiian plants, 1562
Nicotine sulphate, 801
Nigeria
  Dep. Agric. Rep. 1950-1, 1604
  soil fertility, 1604
    maintenance, 1513
Nitrochalk, 1231
N-1-naphthylphthalamic acid, 430, 1601
Nodulation
  beans, 996*
  legumes, 614
  soyabeans, 598
Nodule degeneration, 40
Nomenclature
  fodder-beet, 1025
    Gt. Britain, 638
  Lens spp., 611
  mangels, 1025
  sorghum, 821
  Urena lobata, 1087
  Vicia spp., 611
  weeds, Netherlands, 338, 761, 762
Nomersan, 838
North America
  agro-ecological regions, 409
  plant pathology, 827*
  seed potato certification, 659
Northern Ireland—see Ireland
Northern leaf blight (*Helminthosporium turcicum*), maize, 84

Northern nutgrass—see Nutgrass
Northern Rhodesia
  Dep. Agric. Rep. 1952, 1605
  wild sesame (*Sesame angolense*), 272
Norway
  barley, 6-rowed, 63
  bog cultivation, 824 (book)
  land use, 824
  peat cultivation, 824
  rye, yields and weather, 524
Nutgrass
  Cyperus esculentus (northern), 1122, 1192
  C. rotundus, 322, 764, 1524, 1607
Nyasaland
  agricultural research, 454
  cotton, 241*
  Dep. Agric. Rep. 1950, 1951, 438, 1606
  maize, 81
  sorghum, 102
Oats (*Avena* spp.)
  albinism, 519*
  amino acid content, 1262
  and Aldrin, 372
  and CMU, 1531
  and cobalt, 1261
  and copper, 1187, 1264
  and 2,4-D, 52, 430, 513, 539, 585, 879, 896, 970, 971
  and Dieldrin, 372
  and herbicides, 1601
  and Krilium, 404
  and MCPA, 879, 970
  and micronutrients, 516
  and nickel, 1261
  and smog, 520, 794
  and toxic gases, 795
  and ultrasonic sound waves, 780
  as cover crop for red clover, 41
  as soil indicator, 887
  atmospheric nitrogen, 1567
  A. byzantina, varieties, 49
  A. fatua, 828, 1008, 1009, 1190, 1378, 1481, 1533, 1538, 1600, 1601
  A. fatua spp. *cultiformis*, 1121
  A. fatua ssp. *fatua*, 1121
  A. fatua spp. *fatua* var. *glabrata*, 1121
  A. fatua spp. *fatua* var. *intermedia*, 1121
  A. fatua ssp. *fatua* var. *pilosissima*, 1121
  A. fatua ssp. *fatua* var. *vilis*, 1121
  A. ludoviciana, 828
  A. sativa var. *orientalis*
    characteristics of NIAB-recommended varieties, 47
  A. strigosa, 509
    varieties
      Saia....49
      Sandhafer....1260
  /barley yield, 1324
  boron content, 1563
  bunt, 442
  chemical composition, 44
  cold resistance, 50
  covered smut (*Ustilago avenae*), 44
  diseases, identification, 53
  drought damage, 1254
  ear weight and seed rate, 456
  embryo, respiration, 511*
  fertilizers, 54, 521, 522
    broadcast, 136
    combine drilled, 136
  garlic (*Allium sativum*) in, 513
  germination, 480, 891, 1327
    in field and laboratory, 965
  glume content, 518
  grain characters, 512*
  grey speck, 895
  in rotation, 442
  in USA, 886
    Nebraska, 124, 508
  iron deficiency, 1261
  irrigation, 308
  kernel variation, 1259
  leaf numbers and development stage, 537
  -legume mixtures, studies, 39, 40, 1115
  manganese deficiency, 514, 515, 895, 1187
  manganese sulphate, 514
  manurial value of residues and undersown herbage, 1333
  moisture content, combined grain, 137
  nematodes
    Ditylenchus dipsaci (stalk), 894
    Heterodera major, 894
  oxalate content, 1559
  phosphorus and metabolism, 521
  phosphorus uptake, 1331
  powdery mildew (*Erysiphe graminis*), 1260
  production costs in Scotland, 1498
  Puccinia coronata avenae, 490
  radioactive phosphate assimilation, 1148
  rainfall and yield, S. Dakota, 580
  roots, and water uptake, 613
  sand (*A. strigosa*), 509
  seed rate, 123, 456
  seed storage, 480, 1576
  seed treatment, 50, 53, 480, 1159, 1327, 1542, 1576
  sowing date, 426
  tillage and yields, 747
  undersown with Italian ryegrass, 1115
  undersown with legumes, and weeds, 893
  varieties, 41, 47, 49, 468, 508, 514, 583, 584, 810, 886, 970, 1197, 1202, 1205, 1258, 1331
    Abed....427
    Abed Minor....1594
    Ajax....585
    Andrew....1263
    Arkwin....42
    Bambu II....45, 1257
    Bellone....1594
    Beseler....39
    Black Tartar....889
    Blenda....964, 1257
    Bond....969
    Borris Opus II....582
    Cherokee....1263
    C.I. 5940....1193
    C.I. 5941....1193
    Climax....44
    Clintafe....510
    Clinton....889, 890, 896
    Colo....896
    Craig....890
    Dolinskiĭ GK-16....43
    Eaton....890
    Exeter....585
    Firlbecks Geld....1324
    Fläming....39
    Forkedeer....1193
    Garry Sel. 1692.27....1190
    Golden Rain....44, 517
    Gopher....44
    Grey Winter....888
    Gullregn II....14, 45, 48, 964 1257
    Hein II....48
    Kanota....969
    Kefermarkter....1324
    Kent....890
    Kytø....48
    Landhafer....1260
    Liral Prince....427
    Maldwyn....889
    Marion....896
    Marvellous....888
    Milford....1594
    Mindo....896, 1263
    Minor.... 46, 539
    Missouri 0-205....1260
    Missouri 04015....1260
    MO. 0-205....1193
    Moskovskiĭ A-315....51
    Neosho....1260
    Nordhaugan....442
    Oberkärnter....1324
    Opus....539
    Orfed....442
    Orion II....889, 964
    Orion III....964
    Ørn....48, 582
    Oro....442
    Picton....888
    Primus....889
    Radnor Sprig....889
    Redman....442
    Red Rustproof....1260
    Rex....539
    Richland....490
    R.L. 2123....1190
    S. 84....895, 1256
    S. 147....888, 1597
    S. 172....888, 1597
    S. 220....889
    S. 225....427, 1202, 1594
    Seger....964
    Shasta....432
    Shelby....1263
    Silberhafer....39
    Sisu....45, 1322
    Sol I....48, 964
    Sol II....45, 48, 964, 1257
    Stål....539, 582
    Stammprüfung....1324
    Star....888
    Stormogul II....964
    Stormont Arrow....1256
    Stormont Grandee....1256
    Stormont Iris....427
    Stormont Kern....1256
    Stormont Triumph....1256
    Sun II....46, 426, 427, 1594
    Trio....1257
    Tx. 1....427
    Vanguard....585
    Victoria-Richland....1260
    Victory....889, 891, 1259, 1332
    Vizantiĭsk....517
    Vydvizenec 194....812
    White Mildew Resistant....1260
    Wintok CI-3424....1262

    Yielder....46
    10/3....888
    407-25-6....1193
  variety trials, England and Wales, 888, 889
  vernalization, 1329
    and soil water deficiency, 517
  weeds in, 51, 332, 892
  wild, 430, 769, 828, 1008, 1009, 1121, 1190, 1378, 1481, 1533, 1538, 1600, 1601
  world production, 1584
  yield and rainfall, S. Dakota, 580
  yield estimation by eye, 1255*
Octachlorocyclohexanone, 1601
Octamethyl, 603
Octamethyl pyrophosphoramide, 250, 705
Oil crops in S. Africa, 288
Oil-seed crops
    cocklebur (*Xanthium* sp.), 1062
    in Sweden, 283
Oil-seed poppy—see Poppy
Oil-seed rape—see Rape
Ophiobolus graminis—see Foot rot and Take all
Opium poppy—see Poppy
Ornithopus sativus—see Serradella
Orthocide 406, 661, 912
Oryza spp.—see Rice
Oryzaephilus surinamensis—see Saw-toothed grain beetle
Ottelia alismoides in rice, 115
Ovotran, 250
Oxalate content of forage plants, 1559
Pachydiplosis oryzae, rice, 839
Paka—see *Urena lobata*
Pakistan
  agriculture, 1590 (book)
  fibres, textile, 1450
Pale smartweed—see Smartweed
P-aminobenzoic acid, 1484
Panicum coloratum var. *makarikarensis*, 542
P. miliaceum—see Millet
P. purpurascens—see Para grass
Paper chromatography, 358, 1013
Papua, kenaf, 841
Para grass (*Panicum purpurascens*), 335
Parathion, 26, 250, 375, 603, 705, 830, 1059, 1424
Pardilens calceatus, millet, 106
Partridge pea (*Cassia chamaecrista*), 1151
Parzate, 661
Paspalum conjugatum, 773
P. dilatatum, 1514
P. scrobiculatum, 773
Pavonia urens in Uganda, 270
PCP, 596, 704, 773, 1601
Pea(s)
  and maleic hydrazide, 160
  and Methoxone, 35
  and Premasan, 1349
  and sodium chlorate, 336
  and Spergon, 1349
  and toxic gases, 795
  and ultrasonic sound waves, 780
  aphid (*Macrosiphum pisi*), 159, 603, 1351
  boron content, 1563
  canning in Netherlands, 1348
  Chinese mustard in, 992
  colchicine treatment, 1141
  damping-off, 993
  degree-days, 1353
  dun, 615, 1594
  dwarf and molybdenum, 606
  enzymes in seed and seedling, 605
  fertilizer(s), 617, 828, 995
    and pod setting, 161
    placement, 828, 995
  foliar diagnosis, 1146
  flowering, 161, 1193
  germination, 605, 1140, 1141, 1349
  grown with oats, 39, 40
  heat-sum value, 1353
  in Germany (Central), 990*
  lambsquarters in, 992
  mosaic, 603
  niacin content and photothermal treatment, 1352
  nitrogen uptake by *Rhizobia*, 604
  /oats/vetch mixtures, 1115
  phosphorus requirements, 994
  photoperiodism, 1353
  Pisum sativum var. Pride....603
  pod setting, 161
  quality, 161
  radioactive phosphate assimilation, 1148
  ragweed in, 992
  Rhizoctonia solani, 1350
  riboflavin content and photothermal treatment, 1352
  roots, sodium excreted by, 1188
  seed, 2,4-D absorption, 921
  seed rot, 993
  seed treatment, 603, 993, 1141, 1349, 1350
  selenium content, 165
  Sitona lineata, 614
  sowing date, 1349
  varieties, 1205
    Alaska....1352, 1353
    Black Valentine....1352
    Essex White....1594
    Harrison Glory....1594
    Kloster....991
    Marathon Maple....1594
    Minerva Maple....1594
    Strål....991
    Surprise....1353
    Torsdags II....991
    William Massey....1349
  watering and yield, 617
  water table and yield, 1504
  weather requirements, 168
  weeds in, 158, 1130, 1192, 1348, 1533, 1601
  weevil (*Bruchus pisorum*), 1351
  wild radish in, 602
  X-ray mutant, 991
Peanuts—see Groundnuts
Peat cultivation, Norway, 824
Peat soils, reclamation in Netherlands, 304
Pegomyia hyoscyami—see Beet fly
Penco Defolate, 1454
Penicillin, 787
Pennisetum purpureum—see Elephant grass
P. typhoideum
  spacing, 1197
  varieties, 1197
Penn salt Np-128, 597
Pennsylvania smartweed—see Smartweed
Pennycress (*Thlaspi arvense*), 1126
Pentachlorophenol, 1377
Perennial sowthistle (*Sonchus arvensis*), 1601
Perenox, 202, 832, 1486
Peronospora schachtii—see Downy mildew
Peru, agriculture, 739*
Pestox, 708, 1374, 1424
Petiole sampling, sugar-beet, 1397
Phaseolus spp.—see Beans
Phenol, 1422
Phenoxyacetic acid, 776
Phenoxyl, 434
Phenylurethan, 230
Phosphorus
  absorption
    barley, 1317
    bean and maize foliage, 784
    rice, 1317
  radioactive
    assimilation, 1148
    barley, 1278
    measurement, 1149*
    root studies, 355
Photography, plant roots, technique, 1543
Photoperiodism, 351
  Amaranthus caudatus, roots, 783
  jute, 439, 1084
  kenaf, 266
  maize, 559, 1295
  peas, 1353
  rice, 572, 577, 1316
  roselle, 268
  rye and earing, 897
  wheat, 501
Photosynthesis, 356*, 1245*, 1548, 1613
Phragmites communis, 305
Phygon, 993, 1350, 1376
Phyllotreta atra, millet, 106
P. vittula, millet, 106
Phytocidal index, herbicides, 341
Phyto-hormone—see Growth substances
Phytophaga destructor—see Hessian fly
Phytophthora infestans—see Late blight
Phytotoxicity, 378, 379, 380, 1577*
Pigeon pea (*Cajanus cajan*), root system, 781
  varieties, 839
Pigweed (*Amaranthus* spp.), 772
  in cotton, 834
  in soyabeans, 834
Pink bollworm (*Platyedra gossypiella*), cotton, 249
Piricularia oryzae—see Blast
Pisum spp.—see Peas
Plant(s)
  adaptation, Uruguay, 1195
  and antibiotics, 385
  and radiation, 354
  breeding, progeny testing, 1152
  cell death, 1551
  chloride and phosphate determination, 360
  copper deficiency and enzyme activity, 1564
  cultivated, and weeds, 1137
  day length and light intensity, 351
  drought resistant, 318, 1186, 1247
    and starch content, 1154
    breeding, 1153*
  economic, 822
  electrocution, 834
  enzymes and 2,4-D, 1601

  fertilizer requirement, determination by wilting method, 1566
  flowering and auxin, 1553
  growth
    and antibiotics, 446
    and light in Finland, 587, 793
    and soil, 815*
    and water supply, 349
  hormones, 1554
    and vitamins in root induction, 997
  indicators, 1106
  insecticide aborption, 353, 375
  iron deficiency and enzyme activity, 1564
  leaf absorption and solar radiation, 1545*
  leaf thickness measurement, 1546
  light absorption measurement, 333
  metabolism and boron, 431
  micronutrient determination, 786
  NPK, rapid estimation, 1560
  nutrition
    and foliar spraying, 633
    metal toxicities, 1565*
    sand and water culture methods 419 (book)
  pathology, N. America, 827* (book)
  phosphate estimation, 358
  photothermal effects on, 1613
  physiology, 421, 448
    research in USSR, 1139
  plastid pigments, separation of, 1550*
  poisonous, 1527
    Datura spp., 1528
    in Tasmania, 1529
  potassium determination, 1561
  products, 822 (book)
  protein determination, 357
  quality and weather, 792*
  respiration measurement, 1547
  root development and water table, 1544
  root formation and vitamins, 997
  roots, hormone excretion, 1555
  roots, photography technique, 1543
  sugar estimation, 358
  toxicity by organic insecticides, 804
  translocation of insecticides, 353
  winterhardiness, 1186
  zinc estimation, 785
Platyedra gossypiella—see Pink bollworm
Pleospora herbarum, sweet potatoes, 235
Ploughing depth, and crops, 828
Pluchea lanceolata, 1607
PMA, 596
Poa annua—see Annual bluegrass
Poisonous plants, 1585
  Californian stinkweed, 1529
  capeweed, 1529
  Datura spp., 1528
  greater convolvulus, 1529
  green cestrum, 1527
  in Tasmania, 1529
Poland, sand oats (*A. strigosa*), 509
Polygonum spp.—see Smartweed
Poppy
  oil seed
    in Sweden, 1493
    varieties
      Flora....1493
      Mahndorf....1493
      Peragis....1493
  opium
    fertilizers, 1488
    seed production, 1488
Portugal
  seed exchange, 452
  wheat, classification, 1215
Portulacea sp.—see Purslane
Potassium deficiency, barley, 540
Potassium determination, flame photometer, 1561
Potato(es) (*Solanum* spp.)
  and artificial rain, 853
  and CMU, 1531
  and 2,4-D, 219*, 648
  and farmyard manure, 828
  and herbicides, 672
  and maleic hydrazide, 231
  and Rindite, 1415
  and Röntgen rays, 676
  and sodium chlorate, 336
  and 2,4,5-T, 205
  and thermoperiods, 1041
  and TIBA, 220
  and toxic gases, 795
  aphid, 432, 667, 1423, 1424
  ascorbic acid
    in leaf, and night temperatures, 1429
    in tuber slices, 1430*
  bacterial ring rot (*Corynebacterium sepedonicum*), 1440
  black dot (*Colletotrichum* sp.), 1037
  black spot, 211, 212
  boron content, 1563
  bruising and grading, 685
  carbon dioxide content, determination, 1044
  chemical composition, 193
  chips and specific gravity, 224
  cold resistance, 1032
  Colletotrichum wilt, 1417
  Colorado beetle (*Leptinotarsa decimlineata*), 422, 666
  cultural methods and virus control, 1030
  day length and yield, 1040
  degeneration, 216, 641, 680, 681, 1037, 1426
  diseases, 417, 1598
    in India, 657*
  drying for stock feed, 233*
  dry matter and potassium, 1434
  dry matter and starch, 1598
  eelworm
    Heterodera marioni, 207
    H. rostochiensis, 208, 209, 662, 663, 664
  fertilizer(s), 221, 222, 644, 673, 680, 681, 746, 828, 1028, 1197
    placement, 828
  foliar diagnosis, 1146
  foliar sprays and yield, 1046
  fruit-setting, 845
  fungus resistant varieties, 1420
  Fusarium sp., 660, 1036
  F. caeruleum, 660
  germination, 1414
  golden nematode see Eelworm
  grafting, 1425
  grown from stecklings, 1427*
  harvesting, labour organization, 1409*
  haulm destruction, 203, 214, 215, 442, 647, 648, 1408
  Heterodera rostochiensis, 208, 209, 662, 663, 664
  in Argentina, 201
  in Brazil, 193
  incubation, light and temperature, 199
  insecticides, and flavour, 1597
  in S. Africa, 187
  in Switzerland, 1189
  in tropics, 1407
  irrigation, 650, 1406
    overhead, 753, 828
  late blight (*Phytophthora infestans*), 202, 204*, 661, 1034, 1035, 1597, 1599
  leaf roll, 680, 1419, 1422
  leaf sap extraction, 1045
  leaves, adsorption from fog, 1035
  long sprouting, 1207
  machine- and hand-planted, comparison, 828
  maleic hydrazide and storage, 677
  manganese deficiency, 514, 671
  manganese sulphate, 514
  manured, seed potatoes from, 679
  mealiness and specific gravity, 689
  metabolism, 1043*
  micronutrient content, 674
  mosaic, 1422
  Myzus persicae, 679, 680, 681
  nitrate content and 2,4-D, 678
  planting depth, 828
  plants raised from shoots, 646
  production costs in Scotland, 1498
  protein content, 217, 218, 1042
  quality, 234*, 690*
  radioactive phosphate assimilation, 1148
  ripening changes, 218
  root eelworm—see Eelworm
  root-knot nematode (*Meloidogyne* spp.), 665
  rugose mosaic, 1419
  scab (*Streptomyces scabies*), 205, 206
  seed
    certification, Canada, 653*
    certification, North America, 659
    colchicine treatment, 655
    cutting and pre-sprouting trials, 1413
    cutting and size, 1596
    dormancy, 200
      breaking, 1028, 1414
    fumigation, 1438, 1439*
    in Germany, 196
    in India, 657*
    in Scotland, 195
    in Spain (Castile), 654
    -piece decay, 432
    production
      flowers sprayed with 2,4-D, 1039
      from manured plants, 679
      in Netherlands, 643
    setts
      and thiourea, 442, 656
      cut, and *Fusarium* sp., 660
      cut and yield, 1207, 1405, 1412
      cut, spacing and yield 1028
      healing, and chemicals, 198,
      yield and manuring, 197, 679
    size and sprouting, 644
    size and yield, 644, 1029
    sowing date, 641, 1037, 1197
    spacing, 644, 1029
    sprout removal, 1421, 1607

  storage 232, 1416, 1420
    cut surfaces, 1036
  tubers, cut and yield, 645
  virus detection, 210
shoots, plants from, 646
Solanum spp., 422
S. ballsii, 209
S. demissum, 1040
S. demissum x *S. tuberosum*, 1040
S. neohawkesii, 1033
S. rhomboidei-lanceolatum, 1033
S. sucrense, 209
S. tuberosum spp. *andigenum*, varieties, 1407
sowing date, 644, 645, 650
spacing, 642, 681
specific gravity, 223, 650, 1416
  and mealiness, 689
spotted wilt, 213*
sprout induction by Rindite, 1415.
sprout inhibition, 1436, 1437
sprout inhibitors, 686, 687, 688, 698*
steckling production technique, 1038
stock feed in Netherlands, 649, 682
storage, 225, 227, 677, 684, 688, 829, 1042, 1048*, 1049, 1408, 1436, 1437
  and carbon dioxide, 1435
  and electricity, 1207
  and enzymes, 1433
  and growth substances, 230
  and sloughing loss, 228
  and sprouting, 229
  and temperature, 1435
  clamps and cellars
    Esthonia, 683
    Latvia, 683
    Lithuania, 683
  temperatures, 226
taint and BHC, 1047*
tillage and yield, 188
tissue, water uptake, 1431
trials, 1596
tuber discoloration, 214, 215
tuber formation, 1432
tuber indexing, 670
tuber morphology, 1598
tuber respiration, 1428
tuber size, 1598
tuber skinning, and harvesting date, 833
varieties, 199, 442, 584, 651, 669, 810, 1030, 1039, 1040, 1197, 1410, 1597
  Ackersegen....200, 642, 1426
  Ackersegen N.Ö.....1405, 1411
  Agnes....1405
  Alpha....1412
  Aquila....1426
  Arran Pilot....190
  Ashworth....212
  Berlihingen....641
  Bianca di Como....1041
  Bintje....207, 230, 1411, 1412, 1421, 1422, 1544
  Birgitta....200, 230
  Bliss Triumph....1604
  Böhms Allerfrüheste....1405, 1413
  Böhms Allerfrüheste Gelbe....1411
  C 77-1....207
  C 96-1....207
  C 102-5....207
  C 103-3....207
  C 110-50....207
  Canso....191, 667
  Cherokee....1190
  Chippewa....658, 661, 667, 689
  Corahila Larga....207
  Darjeeling Red Round....197, 1414
  Eigenheimer....192, 200, 230
  Erdgold....1422
  Etoile du Léon....642
  F426....658
  F458....658
  F4328....658
  Falke....1411
  Frühbote....1413
  Gladstone....1438
  Green Moutain....191, 206, 211, 689
  Houma....658
  Irish Cobbler, 188*, 206, 211, 658, 688, 1432, 1437
  Jakobi....1411
  Jubelj....641
  Karnea....641
  Katahdin....191, 199, 201, 206, 212, 232, 667, 677, 1421
  Kennebec....212, 677, 689
  Kerr's Pink....1035
  Keswick....191, 667
  King Edward....230
  King Flat....207
  Kniek....1602
  Kurjer....641, 1032
  Lihtblik....641
  Lomman....194
  Magnum Bonum....200
  Majestic....225, 1429, 1438
  Manota....1190
  Marija Hrennikova....1032
  Mohawk....206, 689
  Naglerner Frühgold....1413
  Nainital....1414
  N.D. 457....1190
  Oktjabrenok....641
  Onolena....1602
  Ontario....206, 212, 689
  Ostbote....1412
  Panther....1411
  Parnassia....514, 1412
  Pentland Ace....1031
  Pontiac....212, 688, 1437
  President....207, 230, 1412, 1421
  Red McClure....678
  Royal Kidney....207, 642
  Rural Russett....224, 672
  Russet Rural....1437
  S. 101....1190
  S. 108....1190
  Sandnudel....230
  San Michele....652
  Sebago....231, 656, 658, 1437
  Sequoia....442
  Sharpe's Express....1438
  Spry's Abundance....1035
  Starkereiche I....514, 1412
  Stormont Dawn....190
  Triumph....211, 214
  Ulster Dale....190
  Ulster Emblem....190
  Ulster Ensign....190
  Ulster Leader....190
  Ulster Premier....190
  Ulster Prince....190
  Ulster Supreme....190
  Up-to-Date....836, 1035
  Voljtman 1177....218
  Voran....1405, 1412
  Voran N.L.....1411
  Vozan....682
  Waseca....1190
  Wekaragis....1412
  Wohltmann....514
  Yampa....206
  627-164....207
  984-MI....1190
  vegetation stages, 1598
  Verticillium wilt, 658, 659, 1418
  virus, 670
    control, 1030, 1424
    detection, 668, 669
    resistant varieties, 1420
    Y, and spacing, 1421
  vitamin C content, 675*
  water table, 1093
    and root growth, 1544
  weeds in, 1192, 1602
  wireworm, 799, 828
  witches' broom in, 1425
  Wulfsoder pit clamp, 684
  yield, 1598
    and day length, 1040
    and depth of ploughing, 828
    and foliar sprays, 1046
    and seed size, 1029
    and straw ploughed-in, 746
Powdery mildew (*Erysiphe graminis*)
  oats, 1260
  wheat, 10, 1234
Premasan, 1349
Premerge, 992, 1416
Prickly poppy (*Argemone mexicana*)—see Mexican poppy
Prodenia ornithogalli—see Yellow-striped armyworm
P. praefica on cowpeas, 1335
Proso (*Panicum miliaceum*)—see Millets
Pseudomonas albopr ecipitans—see Bacterial leaf blight
P. andropogoni—see Bacteriosis
Psocidae—see Book lice
Psylliodes chrysocephala—see Cabbage stem flea beetle
Pteridium aquilinum—see Bracken
Puccinia spp.—see Rusts
Pulicaria crispa—see Tugur
Pulses—see also individual legumes
  in India (Madras), 616
  in S. Australia, 615
Puratized C-12-1525, 993
Purslane (*Portulacea* sp.), 772
Pyrausta nubilalis—see European corn borer
Pythium sp., 1444
P. aphanidermatum, 1376
P. ultimum, 1376
Q*uelea*, 957
Quickweed (*Galinsoga* sp.), 772
R1038, 832
Rabbits in Gt. Britain (Wales), 387
Radiation
  electromagnetic, measurement, 333
  meter, 796
  on plants, 354
Radioactive iodine, 1556
Radioactive phosphorus
  and barley, 1278
  and root activity, 355
  assimilation, 1148
  measurement, 1149*

Ragi—see Finger millet
Ragweed (*Ambrosia* spp.)
  A. artemisiifolia, 893, 992
  A. trifida (giant), 1126
Ragwort (*Senecio jacobaea*), 323
Rainfall
  and cereal yields, S. Dakota, 580
  artificial, 853
  in E. Africa, 1102*
  in Uruguay, 1195
Rain forests and shifting cultivation, 825 (book)
Rama (*Hibiscus cannabinus*)—see Kenaf
Rape (*Brassica* spp.)
  B. campestris var. *oleifera* sub-var. *annua* in Sweden, 284
  B. campestris var. *oleifera* sub-var. *biennis*, 1491
    frost damage, 1491
    seed yield, 1491
    varieties
      Gruber....1491
      Rapido....1445, 1491
      Storrybs....1491
  B. napus
    histology, 1060
  B. napus var. *oleifera*
    boron content, 1563
    cross-pollination, 1061
    in Sweden, 283
  B. napus var. *oleifera* sub-var. *annua*
    in Sweden, 284
    varieties
      Fenno....284
      Gute...284
      Regina B....284
      Sv.0300....284
  B. napus var. *oleifera* sub-var. *biennis*
    and toxic gases, 795
    frost damage, 1057, 1491
    in Sweden, 283
    seed yield, 1491
    sowing date, 1491
    varieties
      Lembke....736, 1057, 1058 1491
      Margo....1058
      Matador..736, 1058
      Regal....1058
      Senraps....736
      Tenus....736
      Wilnensis....736
    catch crop in Germany, 845
    oil-seed
      cabbage stem flea beetle (*Psylliodes chrysocephala*), 1059
      varieties, 1190
    pod shattering, 1597
    root penetration, 1544
    summer, and sodium chlorate, 336
    summer turnip, 284, 795
    variety Sen....1445
    vernalization, 1329
    winter, 283, 735, 1057, 1491
      turnip, 735, 1445, 1491
Raphanus raphanistrum—see Wild radish
R. rugosum—see Wild turnip
Red bollworm (*Diparopsis castanea*), cotton, 242, 832
Red leaf disease, cotton, 1071
Red-legged earth mite (*Halotydaeus destructor*), 800
Red rot—see Leaf anthracnose
Reports
  Australia
    N.S.W. Dep. Agric. Rep. 1949-50, 442
  Basutoland Dep. Agric. 1950, 1952, 837, 1201
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  Great Britain
    Colon. Devel. Corp. 1952, 1593
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      Essex, Hasler and Co., Ltd. 1950-1, 1951-2, 426, 1594
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      Dep. Agric. 1952, 1595
      Scot. Pl. Breed. Sta. 1952, 1031
  India
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    Madras Dep. Agric. 1941-48, 1949-50, 1950-51, 441*, 839
  Ireland
    Northern. Minist. Agric. 1951, 427
    Republic. Minist. Agric. 1950-1, 428
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  Netherlands
    Cent. Inst. Agric. 1951, 829
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  Sierra Leone Dep. Agric. 1949, 1950, 439, 1196
  Somaliland Dep. Agric. 1951, 435
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    Swiss Ass. Test. Distr. Seed Potatoes, 1951-2, 1598
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    Dep. Agric. 1950, 838
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    Dep. Agric. 1952, 1602
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      Agric. Exp. Sta. 1951, 833
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    Indiana. Purdue Univ. Agric. Exp. Sta. 1952, 1193
    New Jersey Agric. Exp. Sta. 1950-1, 431
    N. Cent. Weed Contr. Conf. 1951, 343, 430
    N.E. Weed Contr. Conf. 1953, 1191 1192
    Oregon Agric. Exp. Sta. 1951, 432
    South. Weed Contr. Conf. 1952, 834
Rhizobium spp., 364, 1585
  peas and nitrogen uptake, 604
  soyabean/bean graft, 1150
R. phaseoli, strain efficiency, 363, 1151
Rhizoctonia solani, 1376
  beans, 1350
  peas, 1350
Rhizopertha dominica—see Lesser grain borer
Rice (*Oryza* spp.)
  Aeschynomone indica in, 954
  and 2,4-D, 116
  and fish rearing, 838
  and green manures, 1114
    and fertilizers, 962
  and low temperatures, 960
  and MCPA, 116
  batadella in, 954
  bird pests, 957
  blast (*Piricularia oryzae*), 117, 118, 1311
  -borer, 1311
  breeding in Madras, 839
  broad-leaved weeds in, 116
  brusone, 956
  centres of distribution, 1311
  classification, 1311
  Cnaphalocrocis medinalis, 440
  Coix gigantea in, 954
  cutting height and ratoon yield, 113
  Cyperus dehiscens in, 954
  defoliants, 834
  diseases in USA, 1314*
  diseases manual, 415 (book)
  double cropping, 947
  drying, 120
  Echinochloa colona in, 954
  E. crus-galli in, 954
  E. frumentacea in, 954
  E. stagnina in, 954
  FAO Internat. Comm., 579
  fertilizers, 439, 578, 840, 962, 1612
    and yield in India, 1250
  fields, algal growth, 839
  field selection, 959
  Fimbristylis miliacea in, 954
  foliar diagnosis, 961
  foot rot (*Fusarium moniliforme*), 119

germination, 953, 1542
giant scavenger water beetle (*Hydrous triangularis*), 575
glutinous varieties, 1309
grain fracture, 1207
green manure, 838
in Algeria, 109
in Brazil (Sao Paulo), 110
in Cambodia, 570
in Ceylon, 754
in French Guiana, 568
in French Morocco, 569
in India, 958
in N. Australia, 1307
in rotation, 568
in USA, 576, 949*
  Southern States, 948*
in Viet-Nam, 570
iron absorption, 1317, 1318
irrigation, 111, 569, 1306
Ischaemum rugosum in, 954
'Man', 119
mechanical harvesting trials, 950
mechanical sowing trials, 950
Nephotettix bipunctatus, 839
O. glaberrima in French Sudan, 1101
O. rufipogon 573
O. sativa ssp. *japonica*
  varieties
    Allorio....953
    Ardizzione...953
    Chinês....953
    Munga....953
    Nero....953
    Vialone....953
Ottelia alismoides, 115
Pachydiplosis oryzae, 839
phosphorus absorption, 1317, 1318
photoperiodism, 572, 577, 1316
quality in Morocco, 952
Ripersia oryzae, 839
root system, 781
Schoenobius incertellus, 839
seed, 1313
seed multiplication, Sierra Leone, 1196
seed treatment, 117, 118, 119, 574, 1315, 1542
sowing date, 569
spacing, 838
storage, 120, 953, 1313
sugar content, 1319
sun-cracking of grains, 1207
tadpole shrimps (*Apus biggsi*), 575
three crops a year, 455
Thrips oryzae, 839
topping, 440
transplanting, 840
varieties, 571, 577, 1197, 1308, 1310, 1319
  Afaa Mwanza....1605
  Americano 1600....569
  Aus CH 10....113
  Bagulam....836
  Balilla....569, 1312
  B.C. 70....1605
  B.G. 75....841
  B.G. 79....841
  Bluebonnet 50....1306
  Boro Assam II....1315
  C.H. 45....947
  C.H. 47....947
  China Patna....841
  Co. 13....947
  Co. 25....839
  Co. 26....839
  D54/42....835
  D85/42....835
  D95/42....835
  Dahanala....840
  D.C. 39....439
  Dinamulag....1309
  Dougna Shali....569
  Elon-Elon....961
  Faya....112, 438
  G. 20....840
  Gamti....838
  Guiana 79....439, 836
  Heenati....572
  Iguape-catete....781
  Ishikari Tiroku....1312
  Kahogo....838
  Linihim....1309
  Magnolia....569
  Makalioka 34....440
  Makalioka 803....117
  Makalioka 823 117
  Malagkit Sungsong....1309
  Maratelli....569
  Motka....841
  New Guiana....841
  Norin 20....1312
  Paleod....1309
  Pishori....838
  Ptb 10....947
  Ramcajara....841
  Razza 77....569
  Rinaldo Bersani....569
  Seraup Kechil 36....951
  Sesia....569
  Sona....455
  Sughandi....439
  T. 3....1316
  T. 12....1316
  T. 21....1316
  Vary Lava....117
  Vary Lava 16....440
  Vellai Illankalayan 28061....840
  79....835
water depth and yield, 835
weeding early and late, 838
weeds in, 954, 955
white tip (*Aphelenchoides oryzae*), 574
wild (*Zizania aquatica*), 114
world production, 1584
Rice weevil
  Calandra oryzae, 590
    millets, 838
  Sitophilus oryzae, maize 925
Ricinus sanguineus, germination, 1494
Rindite and potatoes, 1415
Ripersia oryzae, rice, 839
Romania, cotton, 1447*
Röntgen rays
  and *Phaseolus* root formation, 998*
  and potatoes, 676
Rooks, 1164
Root eelworm (*Heterodera rostochiensis*), 663
Root knot nematode
  Heterodera marioni, 207, 693
  Meloidogyne spp., 798*
    electrical destruction, 797
    host range, 1384
    potatoes, 665
    sugar-beet, 1385
  M. incognito var. *acrita*, 1467
Root maggot (*Tetanops myopaeformis*), sugar-beet, 1383
Rootone, 440
Root rot, 628*
  Sclerotium rolfsi, 1010
Rophalosiphum prunifoliae—see Apple grain aphid
Roselle (*Hibiscus* spp.),
  H. sabdariffa
    spacing, 267
    var. L.N.P. 5....268
  H. sabdariffa var. *altissima*
    botany, cultivation and processing, 412
    spacing, 267
Rosette, groundnuts, 600, 982*, 1198
Rotation(s), 1197
  and fertilizers, 749
  beans, 612
  clover, 442
  cotton, 453, 832, 1197
  cowpeas, 1519
  groundnuts, 453
  in collective farms, USSR, 1510
  in France (Alsace), 311
  in French Sudan, 453
  in Germany, 748, 749
  in USSR, 1186, 1210
    Molotov Collective Farm, 1098
  lucerne, 857
  maize, 442, 1519
  millet, 452, 453
  millet/groundnuts, 453
  oats/maize/clover, 442
  rice, 568
  safflower, 278
  sugar-beet, 1363, 1364, 1385
  sunflower/cowpea/maize, 1519
  wheat, 458, 459, 475, 1210
  wheat/lucerne, 857
Rottboellia myurus—see Basket grass
Rubidium content, seed, 777
Rugose mosaic, potatoes, 1419
Rumex sp., 1600
R. crispus—see Curly dock
Russian knapweed (*Centaurea repens*), 1601
Rusts
  Melampsora lini, 724, 729, 1482
  Puccinia spp., wheat, 488
  P. coronata-avenae, 490
  P. glumarum, wheat, 862, 870
  P. graminis
    wheat, 13, 16, 135,* 486, 1235
  P. graminis tritici, 25, 491, 871, 1230, 1236*
  P. polysora, maize, 439, 554*
  P. simplex, barley, 831
  P. triticina, 13, 486, 490
Ryan report, 425
Rye (*Secale cereale*)
  and Aldrin, 372
  and copper, 1187
  and Dieldrin, 372
  and DNOC, 1330
    manurial value, 829
  and toxic gases, 795
  diploid and tetraploid, 1266, 1267
  ear shortening, 19
  fertilizers, 504, 1252
  foot rot (*Ophiobolus graminis*), 21
  hybrids, 898*
  in Australia (N.S.W.), 55
  in Netherlands, 303
  manurial value of residues and undersown herbage, 1333
  morphology, 57*
  mycorrhiza, 58

  oxalate content, 1559
  photoperiodism and earing, 897
  physiology, 1268
  root penetration, 1544
  Sclerotinia borealis, 457
  seed rate, 525
  seed vernalization, 897
  soils and yields in Denmark, 523
  sowing date, 457, 525
  spacing, 525
  take-all—See Foot rot
  thinning, 581
  transplanting, 581
  Typhula borealis, 457
  varieties, 583, 810, 1205, 1265
    Abruzzi....21
    Balbo....21, 55
    Black Winter....55
    Borris Pererug....582
    Borris Perle....523
    Cape....21
    Emerald....55
    Grårug....524
    Haastrup....523
    Kirsch....524
    Kongsrug....523
    Kongsgrug II....524, 582
    Kuĭbyševskiĭ SHI....56
    Kungs I....964
    Kungs II....964
    Malmrug....524
    Marchfelder....1323
    Maria....523
    Nostrana Commune....21
    Øtofte Elite I....523
    Pekka....1322
    Petkus....523, 524, 582, 1252, 1266
    Petkus R.N. 19....897
    Pektus von Lochow....964
    Petkus Zuchtgartengemisch.... 523
    Refsum....524
    Sangaste....524, 1322
    Saratovskaja No. I....56
    South Australian....55
    Stål....523, 964, 1266
    Stålrug....524
    Stooling....21
    Toivo....1322
    Trifolium....523
    Tyrnauer....1323
    Vasa II....524
  vernalization, 897, 1269, 1329
  weather and yields, Norway, 524
  webworm (*Talis pedionoma*), 27
  weeds in, 829
  world production, 1584
Ryegrass
  Westernwolths
    before maize, 543
    seed rate, 543
Saccharum spontaneum—see Kans grass
Safflower (*Carthamus* spp.)
  C. oxyacantha, 1056, 1607
  in Canada, 279
  in rotation, 278
  in USA (California), 278
  varieties, 279
    N 6....278
    N 8....278
    N 10....278, 1190
    N 852....278
  wild, 1056, 1607
St. John's wort (*Hypercium perforatum*) 1600
Salicornia herbacea, 760
Salt, 1377
  and barley and wheat in USA, 527
  removal from water by electro-dialysis, 1172
  resistance
    colonizer plants, 760
    crop plants in Hungary, 1097
  soil in Netherlands, 299, 301, 301
  tolerance
    barley, 527, 903
    sugar-beet, 1365
    wheat, 527
  water-flooded land, Gt. Britain, 1502
  water flooding, crops, 1207
Salt-marsh caterpillar (*Estigmene acraea*), 1386, 1466
Salvinia auriculata, 1119
S. natans, 1119
Sand culture and plant nutrition, 419 (book)
Sand oats (*A. strigosa*), 509
Saw-toothed grain beetle (*Oryzaephilus surinamensis*), 590
Scab (*Streptomyces scabies*), potatoes, 205, 206
Scandix pecten-veneris, 1123
Schoenobius incertellus, rice, 839
Scientific institutions in Ecuador, 394*
Scientific journals in S.E. Asia, 814*
Scientific papers, Middle East list 1950-1, 393
Sclerobia tritialis—see Webworm
Sclerotinia borealis, 457
Sclerotium rolfsi—see Root rot
Scotland—see Great Britain
Secale spp.—see Rye
Seed(s)—see also Germination and individual crops
  Act, 1920, 365
  analysis, Switzerland, 1189
  anatomy, 1175 (book)
  and ultrasonic sound waves, 780
  barley, viviparous, 1277
  botany, 370
  buckwheat, 884
  cereal
    death, 1326
    necrosis, 1326
    sowing method, 589
  certification
    in Denmark, 131
    in Scotland, 1595
    in Sweden, 964
    in Switzerland, 1189
  chemistry, 370
  cotton, viability tests, 1459
  disinfection, thermo-electric apparatus, 967
  dormancy, 1175 (book)
  exchange, Portugal, 452
  germination, 20, 891, 1227
    and thermogenesis, 344
    rice, 953, 1542
  injury, and gases, 1542
  inoculation, 434, 983
  laws, USA, 763
  multiplication, Uruguay, 1195
  physiology, 1175 (book)
  potatoes—see Potatoes
  production, 1175
    bees and herbicides, 1135
    Beta spp., 845
    cotton, 1457
    in Algeria, 129
    in Canada, regulations, 368
    in USSR, 812
    legumes, 1585
    linseed, 1488
    maize in France, 551
    marrow-stem kale, 1445
    mustard, 1492
    poppy (opium), 1488
    potatoes, flowers sprayed with 2,4-D, 1039
    sugar-beet, 175, 626, 1005, 1006, 1020, 1373, 1374, 1375, 1394, 1395,
  rate
    barley, 123, 525
    beans, 426, 609, 845
    cereals, 123
    cotton, 701
    flax, 721
    groundnuts, 112, 1606
    Job's tears, 963
    jute, 263
    kenaf, 266
    millet, 103
    mustard, 286
    oats, 123, 456
    rice, 1313
    rye, 525
    ryegrass (Westernwolths), 543
    serradella, 543
    Urena lobata, 269
    wheat, 2, 5, 123, 456, 463, 525
  rot, peas, 993
  rubidium content, 777
  size
    Lathyrus ochrus, 1000
    wheat, 1230
  sterilization, 346
  storage, 1175, 1350
    chickpeas, 1576
    cotton, 1460
    lentils, 1576
    maize, 553
    oats, 1576
    rice, 953
    wheat, 506, 1576
  testing, 370
    biological methods, 369
    in Australia, 1157
    in Germany, 132
    in Great Britain
      Cambridge, 365
      Scotland, 1595
    in Switzerland, 1597
    in U.K. 367
    in USA, 366
    referee sampling, 1578
    tetrazolium chloride test, 132, 1326
  trade, wheat, legislation in France, 410
  treatment, 370
    apparatus for, 1158
    barley, 67, 480, 481, 482, 1327
      and X-rays, 902
    beans, 1350, 1542, 1576
    buckwheat, 507
    cassava, 440, 1197
    cereals, 966, 1326
    chickpeas, 1576
    cotton, 434, 709, 832, 1069, 1159, 1197, 1474, 1477,
    field crops, 1575
    flax, 829, 1327

    - giant foxtail (*Setaria faberii*), 770
    - groundnuts, 440, 980*, 1197, 1346
    - *Lathyrus ochrus*, 1000
    - lentils, 1576
    - maize, 440, 507, 553, 912, 920, 1288, 1542
    - millet, 566
    - mung, 1141
    - oats, 50, 53, 480, 1159, 1327, 1542, 1576
    - peas, 603, 993, 1141, 1349, 1350
    - potassium nitrate, 1327
    - potatoes, 1207
    - rice, 117, 118, 119, 574, 1315, 1542
      - irradiated, 1315
    - sorghum, 838
    - soyabeans, 147, 148
    - sugar-beet, 1007, 1380, 1383
    - sunflowers, 482
    - sweet potatoes, 1051
    - *Urena lobata*, 1087
    - wheat, 23, 24, 480, 481, 482, 485, 486, 487, 494, 778, 1227, 1327, 1576
  - vernalization, rye, 897
  - viability, 20, 65, 1326
  - weed impurities by numbers, 1539
  - weed impurities by weight, 1539
  - weeds in crop seed samples, 1538
  - wheat
    - cracking, 1228
    - endosperm density, 1226*
    - internal fissuring, 1229
    - osmotic pressure and dormancy, 479
  - yield, rape, 1491
- Seed corn maggot (*Hylemyia* spp.), 1575
- Seedling blight (*Ascochyta gossypii*), cotton, 1462
- Seedling, sterilization, 346
- Semesan, 993, 1418
- *Senecio jacobaea*—see Ragwort
- Senegal
  - millet (*Pennisetum* spp.), 742
  - Sine-Saloum, agriculture, 742
  - sorghum, 742
- *Septanychus texazona*—see Spider mite
- Seradix B, 1073
- Serradella (*Ornithopus sativus*), 303
  - before maize, 543
  - seed rate, 543
- SES, 596, 1601
- Sesame (*Sesamum* spp.)
  - *Bacterium sesami*, 434
  - in Uruguay, 1195
  - *S. angolense*, oil content, 272
  - var. T.M.V....839
  - wild, 272
- *Sesamia* sp.—see Corn stalk borer
- SESIN, 1601
- *Setaria faberii*—see Giant foxtail
- *S. italica*—see Millet
- *S. viridis*—see Green foxtail
- Sewage and food production, 1156*
- Shell Weedkiller, 1522
- Shelter-belts
  - and microclimate, 1515
  - in USSR, 1512
- Shifting cultivation and rain forests, 825
- Shimbu
  - cotton, 1197
  - maize, 1197
- *Sida rhombifolia*, 1197
- Sierra Leone
  - Dep. Agric. Rep. 1949, 1950, 439, 1196
  - fertility, 439
  - green manuring, 439
  - tidal flow and soil, 1196
- *Silene inflata*, 1600
- Silesia, climatic requirements of crops, 791
- Silky bentgrass (*Apera spica-venti*), 1231
- *Sinapis alba*—see Mustard
- *S. arvensis*—see Charlock
- Sinox General—see DNOSBP
- Sinox PE, and maize, 924
- *Sitona lineata* on beans and peas, 614
- *Sitophilus oryzae*—see Rice weevil
- *Sitotroga cerealella*—see Angoumois grain moth
- Smartweed (*Polygonum* sp.), 1531
  - *P. lapathifolium* (pale), 1126
  - *P. pennsylvanicum* (Pennsylvania), 1126
- Smog
  - and lucerne, 794
  - and oats, 520, 794
  - and sugar-beet, 794
  - synthetic, 1568
- Smut(s)
  - maize, 1195
  - *Tilletia caries*, wheat, 485, 486
  - *Ustilago* spp., cereals, 967
  - *U. avenae*, oats, 44
  - *U. nuda*, barley, 60, 61, 67
  - *U. tritici*, wheat, 13, 18, 24
- Snow and water conservation in USSR, 1512
- Sodium
  - arsenate, 314, 647
  - arsenite, 1127, 1422, 1573
  - chlorate, 323, 324, 771, 1127
    - and barley, 336
    - and fodder-beet, 336
    - and linseed, 336
    - and peas, 336
    - and potatoes, 336
    - and rape, 336
    - and sugar-beet, 336
    - and wheat, 336
    - as herbicide, 336
  - 2,4-dichlorophenoxyethyl sulphate, 1416
  - fluosilicate, 702
  - isopropyl xanthate, 1601
  - methyl-chlorophenoxyacetate, 724
  - nitrate, 1377
- Soil and plant growth, 815 (book)
- Soil and soil fertility, 1184 (book)
- Soil and water conservation
  - and grass cover, Tanganyika, 1200
  - and tidal flow, 1196
  - basin-listing, 435
  - in Africa (E. and Central), 759
  - in Argentina, 320
  - in Australia
    - Queensland (Mary Valley), 1105
    - Woomera, 318
  - in Basutoland, 1201
  - in Bechuanaland, 759
  - in Ceylon, 756
  - in India (Bombay), 755
  - in Kenya, 1199
  - in Netherlands, 305, 1116*, 1503*
  - in New South Wales, 1516
  - in Tanganyika (Sukumaland), 298
  - in Tasmania, 319
  - in USA, 817
    - Washington, 459
  - in Wales (Borth Bog), 291
  - methods, 1608
  - shelter-belts, wind-tunnel studies, 1118
  - soil survey, 1608
- Soil bacteria and insecticides, 802
- Soil disinfectants
  - carbon disulphide, 1536
  - chloropicrin, 1536
  - DD, 1467, 1536
  - formalin, 1536
  - Iscobrome II, 1536
- Soil erosion and raindrop impact, 1117
- Soil fertility
  - and mulching, 438
  - in Argentina, 320
  - in Nigeria, 1513, 1604
  - in Sierra Leone, 439
- Soil humus and grass ley, 1514
- Soil-less cultivation, 420 (book)
- Soil nitrification, 361
- Soil salinity—see Salt
- Soil sampling, 402
- Soil water potential, 20
- *Solanum* spp., grafting, 1425
- *S. carolinense*, 1192
- *S. tuberosum*—see Potatoes
- Solusanigran, 1444
- Somaliland Dep. Agric. Rep. 1951, 435
- *Sonchus* sp., 1600
- *S. arvensis*—see Perennial sowthistle
- Sorghum (*Sorghum* spp.), 1305
  - and Aldrin, 372
  - and Dieldrin, 372
  - bacteriosis (*Pseudomonas andropogoni*), 107
  - bibliography, 821
  - bird attack, 838
  - bird resistance, 435, 563, 564
  - catch crop in Germany, 845
  - classification, 821
  - cotton stainer (*Dysdercus superstitiosus*), 567
  - cultivated races, 821 (book)
  - diseases in USA, 945
  - fertilizers, 437, 438, 562, 946, 1604
    - NPK and calcium uptake, 108
  - F$_1$ hybrid, 565
  - germination methods, 1305
  - grain
    - var. Early Kalo....105
  - in French Sudan, 1101
  - in Nyasaland, 102
  - in Queensland, Central Highlands, 1304
  - in S. Rhodesia, 563
  - leaf anthracnose (*Colletotrichum graminicolum*), 105
  - protein content and nitrogen manuring, 562
  - red pigmentation, 1305
  - red rot—see leaf anthracrose
  - seed treatment, 838
  - *S. cernuum* var. *confusum*, in French Sudan, 1101
  - *S. dochna* var. *technicum* (broom corn), in S. Africa, 1303
  - *S. halepense* (Johnson grass), 329, 334, 430, 1601
  - *S. saccharatum* (sweet), 107
    - varieties
      - Atlas....105

    - Planter....105
  - *S. technicum*, 107
  - spacing, 437, 562, 838, 1197, 1304
  - storage, 838
  - *Striga*, 839
  - varieties, 102, 105, 434, 440, 821, 838, 1197
    - Birdproof....564
    - Condine Dura....437
    - Double Dwarf White Sooner....562
    - Dwarf Managil Plainsman....437
    - Early Hegari....437, 562
    - Haakdoorn....563
    - Hegari....563, 564
    - Hermitage....1304
    - Kalo....1304
    - Kitumbili....435
    - Martin....562, 564
    - Masago....435
    - Milo....435
    - Radar....564
    - Radar 491....437
    - Rustenberg....563
    - YSH....563
  - vernacular names, 821
  - witchweed, 564
- *Sorghum* spp.—see Sorghum
- South Africa
  - agriculture, 1506
  - broom corn, 1303
  - hibiscus fibre production, 264
  - Highveld region, maize, 916*
  - irrigation, 1507*
  - maize harvesters, 100
  - oil crops, 288
  - potatoes, 187
  - wheat, kernel characters, 12
  - wild stokroos, 264, 265
- South America
  - *Hordeum* spp., 533
  - Inter-Amer. Agric. Conf. 1195
  - River Plate, disease-resistant crop varieties, 1541
- Southern corn stalk borer (*Diatraea crambidoides*), 1290
- Southern leaf blight (*Helminthosporium maydis*), 84
- Southern Rhodesia
  - Dir. Res. and Specialist Servs Rep. 1951, 437
  - green manures, 1508
  - maize and green manuring, 542
  - Mashonaland, agriculture, 1508
  - Matabeleland, agriculture, 1508
  - sorghum, 563
- South Pacific Commission, 1952, 841
- Sowing date
  - barley, 59, 525, 526
  - beans, 609
  - cassava, 238
  - cereals, 123, 426
  - cotton, 242, 245, 701, 832, 1452, 1605
  - finger millet (*Eleusine* spp.), 1197
  - flax, 717, 721, 1480
  - groundnuts, 600, 1197
  - Job's tears, 963
  - jute, 1485
  - kenaf, 1085, 1086
  - linseed, 726
  - maize, 438, 1197, 1606
  - mustard, 286
  - oats, 426
  - peas, 1349
  - *Phaseolus* spp., 1197
  - potatoes, 641, 644, 645, 650, 1037, 1197
  - rape, 1491
  - rice, 569
  - rye, 457, 525
  - sugar-beet, 620*, 632
  - sweet potatoes, 1197
  - *Urena lobata*, 269
  - wheat, 18, 426, 457, 463, 465, 525, 1209, 1221, 1235
- Sowing methods, cereals, 589
- Soyabean(s) (*Glycine soja*)
  - and Aldrin, 372
  - and CIPC, 596
  - and Crag Herbicide No. 1, 597
  - and 2,4-D, 152, 431, 975, 976
  - and Dieldrin, 372
  - and DNOSBP, 834
  - and herbicides, 596, 597
  - bacterial pustule (*Xanthomonas phaseoli* var. *sojensis*), 974
  - correlated characters, 593
  - fertilizers, 153, 598, 1342
  - germination, 595
  - growth and calcium, 153
  - hard seeds, 595
  - *Heterodera glycines*, 1340
  - industry in Minnesota, 1174 (book)
  - inoculation, 147, 148, 149
  - in Uruguay, 1195
  - in USA, 592
  - leaves, enzyme in, 1341
  - manganese deficiency, 1193
  - nodulation, 434, 598
  - oil and seed maturity, 1193
  - oil content, 151, 593, 598
  - phosphate manuring and yield, 1342
  - pigweed in, 834
  - protein content, 151, 593, 598
  - pseudonodulation induction, 1361
  - *Rhizobia*, 148, 1150
  - root nodules, amino acid composition, 977
  - seed treatment, 147, 148
  - spacing, 1600
  - storage and moisture content, 599
  - sulphur deficiency, 1193
  - varieties, 1190, 1197, 1552
    - Acadian....836, 1604
    - Adams....1336
    - Arksoy....1339
    - Avoyelles....1604
    - Benares....1604
    - Biloxi....1552
    - Bitter of Riesen....595
    - Blackhawk....594, 1174
    - Boone....593
    - Chief....1336
    - Clark....1336
    - Creole....1339
    - Dorman....146
    - Dortchsoy....1337
    - Dunfield....593
    - Earlyana....594, 1338
    - Georgian....1339
    - Gialla Lombarda....595
    - Giessener 71....595
    - Giessener 850....595
    - Harman....1338
    - Harsoy....1338
    - Hawkeye....594, 1338
    - Hongkong....1339
    - Illini....1336
    - Improved Pelican....1602
    - Jackson....1337
    - Lincoln....594, 1336
    - Mamloxi....1604
    - Mamredo....1339
    - Mandarin....593, 594
    - Marron 5B....595
    - Monetta....1339
    - Montagnana A....595
    - Mukden....593
    - Nanking....1339
    - Ogden....146
    - Palmetto....1339
    - Pennsoy....1339
    - Perry....146, 1336
    - Plot 40....836
    - Roanoake....1337, 1339
    - S100....146
    - Seminole....1339
    - Sennari....595
    - Wabash....1336
    - Wilson....595
  - weeds in, 150, 339, 772, 1600
- Spacing
  - barley, 525
  - beans, 426, 608
  - cassava, 238
  - cereals, 123
  - chickpeas, 166
  - cotton, 244, 701, 1197, 1451, 1605
  - fodder-beet, 1367, 1403
  - groundnuts, 112, 437, 600, 978, 1606
  - Job's tears, 963
  - jute, 263, 1485
  - kenaf, 267, 1085
  - linseed, 726
  - maize, 242, 438, 912, 1197, 1606
  - marrow-stem kale, 1445
  - millet, 942
  - mustard, 286
  - *Pennisetum typhoideum*, 1197
  - *Phaseolus* spp., 1197
  - potatoes, 642, 644, 681, 1029, 1421
    - setts (cut) and yield, 1028
  - rice, 838
  - roselle, 267
  - rye, 525
  - sorghum, 437, 562, 838, 1197, 1304
  - soyabeans, 1600
  - sugar-beet, 618, 1367, 1373, 1403
  - swedes, 1367
  - sweet corn, 1300
  - *Urena lobata*, 269
  - wheat, 2, 462, 848, 1221
- Spain
  - seed potatoes, Castile, 654
  - wheat, 469
    - classification, 1216
- Spanish runner beans (*Phaseolus coccineus*)—see Beans
- Spectrophotometer Beckman, 362
- Spergon, 67, 198, 660, 912, 1159, 1350
  - and peas, 1349
- *Spergula arvensis*—see Spurrey
- Spider mite (*Septanychus texazona*), cotton, 250
- Spot blotch (*Helminthosporium sativum*), barley, 61
- Spotted wilt, potatoes, 213*
- Sprinkler irrigation
  - in Italy, 37, 316, 1112*, 1113
  - sugar-beet, 1399
- Spurge (*Euphorbia* spp.)
  - *E. esula* (leafy), 1601
  - *E. lathyris* in Uruguay, 1195
- Spurrey (*Spergula arvensis*), 1232, 1531

SR-406, 1599
Stainers, cotton, 1453
Stalk borer, maize, 85*, 555
Stellaria media—see Chickweed
Stem-borer, maize, 1604
Stem rot (*Macrophomina phaseoli*), jute, 1486
Stem rust (*Puccinia* spp.)
  P. graminis, wheat, 13, 16
  P. graminis tritici, wheat, 10, 1190
Stem sawfly, wheat, 1599
Stewart's wilt, (*Bacterium stewartii*), maize, 84
Sting nematode (*Belonolaimus gracilis*) cotton, 1468
Stinking smut (*Tilletia caries*), wheat, 485, 486
Stinkwort (*Inula graveolens*), 1120
Stizolobium utile—see Velvet bean
Storage
  agricultural products, 1608
  bean seed, 1576
  cassava, 1197
  cereals, 144, 591
    and seed treatment, 480
    equilibrium curves, 398
    moisture content determination, 138
    pests, 590
    temperature recording, 139
  chickpea seed, 1576
  cotton seed, 1460
  fodder-beet, 638, 829
  grain in Sudan, 145
  grain silos, ventilated, 140
  groundnuts, 1602
  lentil seed, 1576
  maize, 557, 561, 1197
    in bags, 90
  mangels, 684
  millet, 838
  oat seed, 1576
  potatoes, 225, 226, 227, 228, 229, 230, 232, 677, 683, 684, 688, 829, 1042, 1048*, 1049, 1207, 1408, 1416, 1433, 1435, 1436, 1437
  rice, 120, 1313
    and germination, 953
  seed, 1175 (book), 1350
    bean, 1576
    cotton, 1460
    lentil, 1576
    oat, 1576
    wheat, 1576
  sorghum, 838
  soyabeans, and moisture content, 599
  sugar-beet, 170, 637, 1371, 1391, 1400, 1401
    stecklings, 626, 829
  sweet potatoes, 235, 697, 699, 1052, 1441
  temperature, seed potatoes, 1421
  turnips, 684
  wheat, 442, 506, 1253
    seed, 1576
Streptomyces albus, 1159
S. scabies—see Scab
Striga sp., 1607
  sorghum, 839
S. hermonthica—see Witchweed
S. lutea—see Witchweed
Stripe rust (*Puccinia glumarum*) wheat, 13
Stunt, wheat, 493
Sub-irrigation in Netherlands, 302
Sudan
  Anglo-Egyptian, flora, 1180 (book)
  bean nodulation, 434
  French
    agriculture, 1101, 1603
    rice, 1101,
    sorghum, 1101
  grain storage, 145
  Minist. Agric. Rep. 1948-9, 434
Sugar-beet (*Beta vulgaris* var. *saccharifera*)
  and borax, 179
  and copper, 1187
  and 2,4-D, 1390
  and day length, 184
  and Endothal, 1378
  and fodder-beet, comparison, 640
  and glutamic acid, 185
  and maleic hydrazide, 1190, 1390, 1391
    and leaf growth, 635
  and micronutrients, 1187
  and smog, 794
  and sodium chlorate, 336
  and soil salinity, 1365
  and toxic gases, 795
  beet fly (*Pegomyia hyoscyami*), 830
  beet yellows, 828
  black leg, 627
  bolting and cold treatment, 176
  bolting, yield and sucrose content, 1372
  boron content, 1563
  chemical composition, varieties and location, 1370
  combine harvesting, 636*
  damping off, 1376
  diseases and pests in Netherlands, 820 (book)
  downy mildew (*Peronospora schachtii*), 1368
  dry matter and yield, 171
  fertilizers, 640, 746, 1021*, 1022, 1023, 1024*, 1363, 1364, 1367, 1398, 1399
  fodder
    harvesting date, Denmark, 639
    irrigation, overhead, 753
    varieties
      Pajbjerg Rex....753
      Pajbjerg Rex IX....639
  foliar diagnosis, 1146
  foliar sprays, 1390, 1398
    and nutrient uptake, 633
    and yield, 1046
  germination and spacing, 1373
  germination and sound-wave treatment, 1007
  glutamic acid, 1014, 1371
  green foxtail in, 1009
  gummosis, 182
  harvesting machinery, 830
  hoeing, 621
  hybrids, vegetative, 1392*
  in hills, Italy, 622
  in rotation, 1363, 1364
  in USA
    Nebraska, 1001
    S. Dakota, 1001
    Wyoming, 1001
  in USSR (Krasnodar), 1003
  irrigation, 173, 1024*, 1399
    overhead, 828
    sprinkler, 1399
  Laphygma exigua, 1012
  leaf spot (*Cercospora beticola*), 1369, 1381, 1382, 1597
  leaves, nitrogen content, 1017
  lignin formation in roots, 1018*
  maleic hydrazide and storage, 1400, 1401
  manganese deficiency, 830
  mechanization, Italy, 1362*
  metabolism, 350, 1015*
  nematode, 1599
  on saline soils, 172
  paper chromatography, 1013
  pests, Italy, 1387
  petiole diagnosis of nitrogen, 1016
  petiole sampling, 1397
  physiology, 1396
  plant density, 619, 632, 830
  pollen dispersion, 1394
  polyploid, 623, 624, 1019
  rolling or harrowing after sowing, 830
  rooting induced by growth substances, 183
  root knot nematode (*Meloidogyne* sp.), rotational control, 1385
  root maggot (*Tetanops myopaeformis*) 1383
  root rot, 628*
    Sclerotium rolfsi, 1010
  roots, chemical composition, 634
  root weight
    and 2,4-D, 1390
    and sugar content, 1371
  rotations, 1385
  salt-marsh caterpillar (*Estigmene acraea*), 1386
  salt tolerance, 1365
  seed-drills, Dutch, 830
  seedlings
    black root, 1380
    cold treatment, 177
      and bolting, 176
    damping-off, 1380
    photothermal treatment, 1395
  seed, polished, 830
  seed production, 175, 626, 1005, 1020, 1373, 1374, 1394, 1395
    and boron, 1375
    and growth substances, 1375
    from overwintered plants, 1006
  seed storage, 829
  seed treatment, 1007, 1376, 1380, 1383
  soil humidity, 178
  sowing date, 620*, 623, 632
  spacing, 618, 1367, 1373, 1403
  storage 637, 1371, 1391, 1400
    and maleic hydrazide, 1400, 1401
    losses, 170
    stecklings, 626
  sugar content, 623
    and day length, 1393
    and maleic hydrazide, 635, 1390
    and manuring, 1364
    and root weight, 1371
    and temperatures, 1393
    and topping and lifting, 830
  sugar loss
    and harvesting methods, 170
    and topping, 169
    in clamps and heaps, 170
  Temnorrhinus mendicus, 1011
  tops, chemical composition, 634

  varieties, 174, 178, 1002, 1366
    Adefa 17....623
    Adefa 45,....623
    B-23....178
    Beta Y 19....1382
    Beta 242/53.....1367
    Buszinsky....1367
    Eagle Hill 651 III....623
    Glostrup S....623
    G.W. 304....1393
    Hilleshög....624
    Hilleshög K....624
    Hilleshöog Svea K....1004
    Hunsballe X....623
    I-1305....178
    I-1305E....1020
    Klein Wanzleben E....176, 1004
    Klein Wanzleben N....176, 623, 1190
    Klein Wanzleben R.C.....1382
    Klein Wanzleben Z....176
    Maribou N....623, 624
    Maribou P....623, 624
    M.W. III....1369
    M.W. 131....1369
    N....619
    P....619
    RD 2....1382
    Rimpau....176
    Rovigo....1382
    U.S.-12....442
    U.S. 15....1368
    U.S. 22....1365
    U.S. 22/3....1368, 1393
    U.S.-33....442
    U.S. 56/2....1368
    U.S. 75....1368
    U.S. 215 × 216....1382
    U.S. 215 × 21613....1382
    U.S.-A737....442
    V. 23N....1020
    Z.....619
    Zwaanesse III....1004
    6-419-X....1370
    8-601-0....1370
  vernalization, 184, 625
  virus disease and growth, 1389*
  virus disease and yield, 1389*
  virus yellows, 830, 1388*
    in Netherlands, 632
    in USA, 630
    serological diagnosis, 631
  water requirement, 173
  water table, 1093
  weeds in, 1377, 1378, 1379
  wild oats in, 1008, 1009
  yellowing virus diseases, 828
  41 yellows, 631
  yield
    and depth of ploughing, 828
    and foliar sprays, 1046
    and plant density, 830
    and straw and compost ploughed-in, 746
Sulfasan, 597
Sulforon, 1190
Sulphanilamide, 1484
Sulphenone, 250
Sulphur, 660, 838, 1462
  deficiency, soyabeans, 1193
  dust, 250
Sunflower(s) (*Helianthus annuus*)
  and 2,4-D, 734
  and TIBA, 220
  atmospheric nitrogen, 1567
  cake and meal, 281
  in French Morocco, 1489
  in Uruguay, 1195
  irrigation and oil content, 282
  kernel, chemical composition, 280
  Laphygma exigua, 1012
  oil determination, 1490
  oil extraction, 280
  seed treatment, 482
  varieties, 1197
    Advance....442
    Gigante da Rússia No. 64....733
    Grey Seeded....1604
    Hungarian....1604
    Jupiter....1489
    La Estanzuela No. 53....733
    Línea-16....733
    Línea-30....733
    Riscado....733
    Russian Giant....437
    Saratovskiĭ....282
    Saratovskiĭ 169....734
    Saturn....437, 1604
    Sel Fischer-100....733
    Sunrise....442, 1604
    VNIIMK 4966....282
    Ždanovskiĭ 8281....282
    169....282
    4036....282
Surinam
  agriculture, 314
  drainage, 314
  land reclamation, 314
Swede(s) (*Brassica napus*)
  boron content, 1563
  cabbage root fly (*Erioischia brassicae*) 186
  fertilizers, 1367
  harvesting date, Denmark, 639
  spacing, 1367
  varieties
    Bangholm....639
    Hoffman's Gelb....1367
    Wilhelmsburger....639, 1367
  vernalization, 789
Sweden
  barley, 1273
  camelina, 283
  farm costing methods, 1107
  herbicides, use in, 1534
  oil-seed crops, 283
  oil-seed poppy, 1493
  rape, 283, 284
  rural economics, 1107
  seed certification, 964
Sweet clover (*Melilotus alba*), 459
  as green manure for wheat, 458
Sweet corn—see Maize
Sweet potato(es) (*Ipomoea batatas*)
  and 2,3,5-tri-iodobenzoic acid, 1442
  ascorbic acid content, 697
  carotene content, 237
  corky spot, 1052
  crabgrass (*Digitaria* spp.), 692
  diseases, 417
  fertilizers, 696
  germination, 1051
  internal cork, 694, 1441
  mineral uptake, 695
  Pleospora herbarum 235
  root knot nematode (*Heterodera marioni*), 693
  seed treatment, 1051
  sowing date, 1197
  sprout induction, 691
  storage, 235, 697, 699, 1052, 1441
  varieties, 236, 691, 1197
    Allgold....1050, 1441
    B. 196....839
    Goldrush....1441
    Heartgold....1441
    L.187....236
    L.244....236
    Mississippi....439
    Pelican....1441
    Porto Rico....694
    Porto Rico Unit 1....1441
    Processor....1441
    Queen Mary....1441
  weeds in, 692
  weevil (*Cylas formicarius elegantulus*) 236
Sweet sorghum—see Sorghum
Switzerland
  maize, 76
  potatoes, 1189
  seed analysis, 1189
  seed certification, 1189
  seed testing, 1597
  Swiss Ass. Test. Distr. Seed Potatoes Rep. 1951-2, 1598
  Zurich-Oerlikon Fed. Exp. Sta. Rep. 1950-1, 1597
Sylepta derogata—see Leaf roller
Systemic fungicides, 1572
Systox, 250, 705, 1374
  in plants, 376
2,4,5-**T**, 116, 688, 776, 922, 1120, 1128, 1130, 1182, 1524, 1600
  and potatoes, 205
Tadpole shrimps (*Apus* spp.)
  A. biggsi, 575
  A. oryzaphagus, 575
Take all (*Ophiobolus graminis*)—see Foot rot
Talis pedionoma—see Webworm
Tanganyika
  Dep. Agric. Rep. 1950, 838
  Dep. Sci. Anim. Husb. Rep. 1951, 1200
  Sukumaland
    agriculture, and soil and water conservation, 298
Taro (*Colocasia* sp.)—see Cocoyam
Tarophagus proserpina on cocoyam, 1443
Tartary buckwheat (*Fagopyrum tataricum*), 322
Tasmania, soil and water conservation, 319
Taxonomy, concepts, 790
TCA, 335, 596, 834, 922, 1009, 1122, 1127, 1130, 1190, 1378, 1379, 1416, 1481, 1533, 1600, 1601
  and linseed, 728
TCNB, 230, 686
TDE, 706
Telluric acid, dehydrase, 779
Temnorrhinus mendicus on sugar-beet, 1011
Teosinte (*Euchlaena mexicana*)
  amino acid content, 1320
  nutritive value, 1320
Tephrosia candida, root system, 781
Termites, groundnuts, 434
Terramycin, 446
  and maize, 787
Tetanops myopaeformis—see Root maggot

Tetranychus bimaculatus—see Two-spotted mite
Thiolutin, 1159
Thiophosphate, 612
Thiourea and potatoes, 442
Thistles, 336
Thlaspi arvense— see Pennycress
Thrips
  Frankliniella fusca, cotton, 705
  groundnuts, 434
  Thrips oryzae, rice, 839
TIBA and potatoes, 220
TIBA and sunflowers, 220
Tick beans—see Beans
Tide, wetting agent, 93
Tilletia caries—see Smuts
T. tritici—see Bunt
Tithonia diversifolia, cover crop, 1523
TM-1, 377, 705
Toxaphene, 252, 257, 377, 705, 706, 708, 828, 1335, 1386
Toxin p, 1576
Toxoptera graminum—see Greenbug
Trace elements—see Micronutrients
Tree cassava, green manure, 838
Trichloracrylate, 1601
Trichlorobenzoic acid, 1601
Trifolium alexandrium—see Berseem
T. pratense—see Clover
Trigonotylus ruficornis, millet, 106
2,3,5-tri-iodobenzoic acid, 1163
  and sweet potatoes, 1442
2,3,5-triphenyltetrazolium chloride, dehydrase, 779
Triticum spp.—see Wheat
Tritisan, 486
Tufan, 1422
Tugur (*Pulicaria crispa*), 434
Turkey, agriculture, 295
Turnip(s) (*Brassica* sp.)
  B. tournefortii, 767
  cabbage root fly (*Erioischia brassicae*), 186
  in Netherlands, 1404
   development during growth, 1027
  production costs in Scotland, 1498
  Raphistrum rugosum, 768
  storage, 684
  varieties
   Gelria....1404
   Halflange Blauwkop C.B.....1404
   Jobe....1027, 1404
   Siloga....1404
  vernalization, 789
  wild, 767, 768
Tussilago farfara, 1124
Two-spotted mite (*Tetranychus bimaculatus*), cotton, 250
Typha spp., 314
Typhula borealis, 457
Tyroglyphus farinae—see Flour mite
U46, 802
Uganda
  cotton, 1448*
  Dep. Agric. Rep. 1951, 1198
  Pavonia urens, 270
UNESCO book coupons, 444
United Kingdom—see also Gt. Britain
  farm income distribution, 1499
  seed testing, 367
United Nations
  Dep. Econ. Affairs Proc. 1949, 1608
Urena spp., 1087
U. lobata
  botany, cultivation and processing, 412
  fertilizers, 1197
  germination, 1087
  seed anatomy, 1087
  seed rate, 269
  seed treatment, 1087
  sowing date, 269
  spacing, 269
  varieties, 1087
   Communis....1487
   Nigeria UL 01....1487
  vernacular names, 1087
Uruguay
  agriculture, 1104
  cotton, 1195
  flax, 1195
  groundnuts, 1195
  rainfall, 1195
  seed multiplication, 1195
  sesame, 1195
  soyabeans, 1195
  spurge, 1195
  sunflowers, 1195
  weather, 1195
USA
  agriculture, 408 (book), 817
  Alabama
   cotton, 243
    pests, 253
  barley, 900
  California, safflower, 278
  cotton, 1449*
   research 1951, 258
  Dep. Agric..
   Bibl. Weed Invest., 1182
   Rep. 1952, 1602
  Florida
   Agric. Exp. Sta. Rep. 1951, 833
   kenaf, 1086
   Soil Sci. Soc. Proc. 1948-9, 1194
  fungicides, 805*
  groundnuts, 1343
  Indiana
   maize, 1284*
   Purdue Univ. Agric. Exp. Sta. Rep. 1952, 1193
  irrigation, 817
  Kentucky, hemp, 1081
  linseed, 1053
  maize storage, 561
  Minnesota, soyabeans, 1174
  Nebraska
   barley, 124
   oats, 124, 508
   sugar-beet, 1001
   wheat, 124
  N. Cent Weed Contr. Conf. Rep. 1951, 343, 430
  N. E Weed Contr. Conf. 1953, 1191, 1192
  New Jersey Agric. Exp. Sta. Rep. 1950-1, 431
  oats, 886
  Oregon
   Agric. Exp. Sta. Rep. 1951, 432
   land use, 1517
  Pacific States, flora, 823 (book)
  rice, 949*
   diseases, 1314*
  seed testing, 366
  soil conservation, 817
  sorghum diseases, 945
  South Dakota
   rainfall and cereal yields, 580
   sugar-beet, 1001
  Southern States, rice, 948*
  Southern Weed Contr. Conf. Proc. 1952, 834
  soyabeans, 592
  State seed laws, 763
  sweet corn, 936
  Texas
   cotton, 1063
   rice, irrigation and yields, 1306
   wheat, 1208
  virus yellows, 630
  Washington, soil and water conservation, 459
  weeds, 330
   noxious, 763
  wheat, 858
  wild rice (*Zizania aquatica*), 114
  Wisconsin, hemp, 1081
  Wyoming, sugar-beet, 1001
USSR
  arid regions, agricultural development, 1109
  buckwheat, viviparous, 885
  climate, 1186,
  collective farms, 1186 1510, 1511*
  dictionary of medicinal, essential, oil and poisonous plants, 1186 (book)
  European SSR, agriculture, 1100
  flax, 1078
  hemp, 1082
  irrigation, 1109, 1110*, 1111, 1501
  Kamalinsk State Breed. Sta., 812
  Kirgiz State Breed. Sta., 811
  Krasnodar, sugar-beet, 1003
  Kulundinsk steppe, climate and vegetation, 1512
  linseed, 1078
  mechanization, 1186, 1510
  Middle Volga, wheat sown on stubble, 856
  Molotov Collective Farm, 1098
  N. Osetin State Breed. Sta., 1570
  plant physiology, 1139
  Priekuli State Breed. Sta., 810
  Repetek Desert Res. Sta., 1099
  rotations, 1098, 1186, 1510
  seed production, 812
  shelter-belts, 1512
  snow and water conservation, 1512
  soil types, 1186
  Ukraine
   collective farming, 1511*
   wheat, irrigated, 867, 868
  wheat, 4, 461, 477, 856, 857
Ustilago spp.—see Smuts
Vancide 51, 912
Varieties
  Bambarra groundnut, 1197
  barley, 14, 15, 60, 61, 62, 63, 64, 68*, 70, 71, 411, 428, 468, 482, 526, 527, 528, 529, 530, 531, 535, 539, 582, 583, 584, 585, 810, 831, 862, 894, 901, 903, 964, 969, 970, 1197, 1205, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1280, 1322, 1323, 1324, 1331, 1332, 1552, 1594, 1597, 1602
  bean, 1205, 1355, 1594
  black gram, 839
  buckwheat, 810, 1205
  cassava, 239, 700, 838, 1197, 1604
  cereal, 126, 127*, 582

  chickpea, 839
  cotton, 244, 245, 247*, 248, 256, 453, 701, 703, 710, 713, 832, 836, 839, 1067, 1071, 1072, 1073, 1074, 1075, 1197, 1452, 1456, 1458, 1469, 1470, 1474, 1606
  cowpea, 439, 839, 1605
  Dolichos lablab, 434, 839
  flax, 260, 427, 449, 716, 717, 719, 720, 721, 722, 724, 829, 1198, 1222
  fodder-beet, 176, 640, 1025, 1026, 1367, 1402, 1403, 1592
  green gram, 839
  groundnut, 112, 155, 157, 437, 453, 600, 833, 983, 988, 1197, 1604
  horse gram, 839
  jute, 1083
  kenaf, 1086
  Lathyrus sativus, 164
  linseed, 274, 275, 426, 442, 716, 726, 727, 829, 838, 1053, 1054, 1482, 1604
  lucerne, 812
  lupin, 615, 1205
  maize, 72, 73, 75, 76, 79, 80, 81, 82, 91, 99, 437, 438, 442, 544, 547, 548, 560, 583, 839, 908, 909, 910, 911*, 912, 913, 915, 916*, 917*, 923, 926, 929, 938, 1197, 1283, 1284, 1285, 1287, 1596, 1602, 1605, 1606,
  mangel, 639, 640, 1025, 1592
  millet, 102, 103, 1205
  oat, 39, 41, 42, 43, 44, 45, 46, 47, 48, 49, 51, 426, 427, 432, 442, 468, 490, 508, 510, 514, 517, 539, 582, 583, 584, 585, 810, 812, 886, 888, 889, 890, 891, 895, 896, 964, 969, 970, 1190, 1193, 1197, 1202, 1205, 1256, 1257, 1258, 1259, 1260, 1262, 1263, 1322, 1324, 1331, 1332, 1594, 1597
  pea, 615, 991, 1205, 1349, 1352 1353, 1594
  Pennisetum typhoideum, 1197
  Phaseolus spp., 1197
  potato, 188*, 190, 191, 192, 194, 197, 200, 201, 206, 207, 211, 212, 214, 218, 224, 230, 231, 442, 514, 584, 641, 642, 651, 652, 658, 661, 667, 669, 672, 677, 678, 682, 688, 689, 810, 836, 1030, 1031, 1032, 1035, 1039, 1040, 1041, 1190, 1197, 1405, 1407, 1410, 1411, 1412, 1413, 1414, 1420, 1421, 1422, 1426, 1429, 1432, 1437, 1438, 1544, 1597, 1602, 1604
  rape, 284, 736, 1058, 1190, 1445, 1491
  rice, 112, 113, 117, 438, 439, 440, 455, 569, 570, 571, 572, 577, 781, 835, 836, 838, 839, 840, 841, 947, 951, 953, 961, 1197, 1306, 1308, 1309, 1310, 1312, 1315, 1316, 1319, 1605
  roselle, 268
  rye, 21, 55, 56, 523, 524, 582, 583, 810, 897, 964, 1205, 1252, 1265, 1266, 1323
  safflower, 278, 279, 1190
  sesame, 839
  sorghum, 102, 434, 435, 437, 440, 562, 563, 564, 821, 838, 1197, 1304
  soyabean, 146, 593, 594, 595, 836, 1174, 1190, 1197, 1336, 1337, 1338, 1339, 1602, 1604
  sugar-beet, 174, 176, 178, 442, 619, 623, 624, 1002, 1004, 1020, 1190, 1365, 1367, 1368, 1369, 1370, 1382, 1393
    fodder, 639, 753
  sunflower, 282, 437, 442, 733, 734, 1197, 1489, 1604
  swede, 639, 1367
  sweet corn, 936, 1300
  sweet potato, 439, 691, 694, 839, 1050, 1197, 1441, 1602
  turnip, 1027, 1444
  Urena lobata, 1087, 1487
  vetch, 615, 1205
  wheat, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 21, 24, 29, 30, 31, 371, 410, 426, 455, 460, 463, 464, 465, 466*, 467, 468, 470, 471, 472, 473, 474, 475, 476, 477, 482, 483, 490, 491, 492, 502, 506, 527, 582, 583, 584, 810, 812, 829, 837, 854, 855, 859, 860, 861, 862, 864, 866, 868, 870, 871, 872, 873, 876, 877, 878, 964, 969, 970, 1188, 1190, 1202, 1205, 1208, 1210, 1211, 1212, 1213, 1217, 1219, 1220, 1221, 1222, 1223, 1224, 1234, 1235, 1240, 1243, 1245*, 1246, 1247, 1248, 1252, 1266, 1322, 1323, 1324, 1331, 1332, 1594, 1599, 1602
  yam, 1197
Vegetable crop diseases, 417 (book)
Vella annua—see Ward's weed
Velvet bean (*Stizolobium utile*), 1151
Vernalization, 1558, 1596
  barley, 1329
  lupins, 1329
  maize, 1287
  oats, 517, 1329
  rape, 1329
  rye, 897, 1269, 1329
  sugar-beet, 184, 625
  swedes, 789
  turnips, 789
  wheat, 28, 1329
Verticillium albo-atrum—see Verticillium wilt
Verticillium wilt (*Verticillium* spp.)
  potatoes, 658, 659
  V. albo-atrum, potatoes, 1418
  V. dahliae, cotton, 832
Vetch(es) (*Vicia* spp.)
  oats/peas mixture, 1115
  varieties, 1205
  V. articulata, 615
  V. dasycarpa, 615
  V. ervilia, 615
  V. pannonica, 845
  V. sativa, 615
    and Agroxone, 999
    boron content, 1563
    watering and yields, 617
  V. villosa, 845
  weather requirements, 168
  winter, summer-sown, 845
Vicia spp.—see also Beans and Vetches
  German nomenclature, 611
  morphology, 611
  oxalate content, 1559
  systematics, 611
Vigna catjang, 755, 1140
V. sesquipedalis, 1151
V. sinensis—see Cowpeas
V. unguiculata, varieties, 839
Virus
  yellow-dwarf, cereals, 969
  yellows
    in USA, 630
    sugar-beet, 632, 830, 1388*
      serological diagnosis, 631
  Y, potatoes, 1421
  41, 631
Voandzeia subterranea—see Bambarra groundnut
Wales—see Great Britain
Ward's weed (*Vella annua*), 766
Water culture and plant nutrition, 419
Water hyacinth (*Eichhornia crassipes*), 440, 1194, 1607
Water requirements, flax, 717
Water table
  and cotton yield, 1586
  and crop yield, 1504, 1544
Water use
  in Africa, 759
    Bechuanaland, 759
    Central, 759
    East, 759
Weather
  and crops, 189
  and wheat development, 877
  in Uruguay, 1195
Webworm (*Talis pedionoma*)
  barley, 27
  rye, 27
  wheat, 27
Weeds, 1181, 1182 (book)
  Adonis aestivalis, 1123
  Aeschynomone indica, 954
  Agropyron repens, 1124
  alligator weed, 1194
  Allium vineale, 1192
  Anastropus compressus, 773
  and calcium cyanamide, 337
  and cultivated plants, 1137
  and fallows, 1124
  and green manures, 1114
  and hormone preparations, 1134
  and kainit, 337
  annual bluegrass, 1379
  aquatic, 1191, 1194
  Asclepias syrica, 1192
  Asphodelus tenuifolius, 1232
  Barbarea vulgaris, 1192
  barnyard grass, 1379
  basket grass, 1520
  batadella, 954
  Bermuda grass, 334, 335, 773, 1127, 1607
  bindweed, 334, 430
  blackgrass, 1521
  bracken, 324, 325, 326, 1595
  brome grass, 1127
  Bromus spp., 430
  butterprint, 1126
  Californian stinkweed, 1529
  Canada thistle, 1601
  capeweed, 1529
  Carthamus oxyacantha, 1607
  Caucalis lappula, 1123
  Chara fragilis, 434
  charlock, 331
  chemical and mechanical control, comparison, 775

  chemical composition, 1537
  Chenopodium album, 1232
  chickweed, 772, 1530
  Chinese mustard, 992
  Chrysanthemum segetum, 1526
  Cichorium intybus, 1192, 1600
  Cirsium arvense, 774, 1192
  C. incanum, 774
  cogon, 322, 773, 1523
  Coix gigantea, 954
  couch grass, 334, 336, 1127, 1192, 1531, 1533, 1601
  crabgrass, 692, 772, 834
  curly dock, 1126
  Cyperus dehiscens, 954
  C. ferruginescens, 1524
  day nettle, 1130
  Delphinium consolida, 1123
  Dichromena ciliata, 1524
  Echinochloa colona, 954
  E. crus-galli, 954
  E. frumentacea, 954
  E. stagnina, 954
  Erythrina glauca, 314
  Euphorbia esula, 1601
  farm, 818 (book)
  field bindweed, 1190, 1232, 1601
  Fimbristylis miliacea, 954
  foxtail, 1481
  Galeopsis sp., 51
  Galium tricorne, 1123
  germination, 892
    and 2,4-D, 1126
  giant foxtail, 770
  giant ragweed, 1126
  greater convolvulus, 1529
  green cestrum, 1527
  green foxtail, 1009, 1190, 1379
  horsetail, 1127
  hoary cresses, 1601
  hoary pepperwort, 771, 1525
  in Australia, 776
  in beans, 772, 1130
  in cereals, 133, 1192, 1195
  in Ceylon, 819 (book)
  in cotton, 339, 704, 772, 834
  in flax, 721, 723, 724, 772, 829, 1601
  in groundnuts, 1345
  in Gt. Britain, identification, 818
  in India, 1607
  in linseed, 276, 728, 829, 1190, 1533
  in maize, 339, 772, 922, 924, 1192
  in Netherlands, identification, 761, 762
  in oats, 51, 892
    undersown, 332
  in peas, 158, 1130, 1192, 1348, 1533, 1601
  in potatoes, 1192, 1602
  in rice, 116, 954, 955
  in rye, 829
  in soyabeans, 150, 339, 772, 1600
  in sugar-beet, 1377, 1378
  in USA, 330, 343, 763
  in wheat, 892
  Ischaemum rugosum, 954
  Johnson grass, 329, 334, 430, 1601
  Kans grass, 327, 1520, 1607
  lalang grass, 1522
  lambsquarters, 772, 893, 1530
  leafy spurge, 1601
  Linaria sp., 1600
  Matricaria inodora, 892
  Medicago denticulatus, 1232
  Melampyrum arvense, 1123
  Melilotus indica, 1232
  Neslia paniculata, 1123
  northern nutgrass, 1122, 1192
  nutgrass, 322, 764, 765, 834, 1524, 1607
  on railroad tracks, 1127
  pale smartweed, 1126
  para grass, 335
  Paspalum conjugatum, 773
  P. scrobiculatum, 773
  Pennsylvania smartweed, 1126
  pennycress, 1126
  perennial sowthistle, 1601
  pigweed, 772, 834
  Pluchea lanceolata, 1607
  purslane, 772
  quickweed, 772
  ragweed, 893, 992
  ragwort, 323
  red rice, 573
  Rumex sp., 1600
  Russian knapweed, 1601
  Salvinia auriculata, 1538, 1119
  S. natans, 1119
  Scandix pecten-veneris, 1123
  seed in crop samples, 1538, 1539
  Setaria spp., 430
  Silene inflata, 1600
  silky bentgrass, 1231
  smartweed, 1531
  soil disinfectants, 1536
  Solanum carolinense, 1192
  Sonchus sp., 1600
  S. arvensis, 1124
  Spergula arvensis, 1232, 1531
  stinkwort, 1120
  St. John's wort, 1600
  striga, 1607
  sweet clover, 1232
  Tartary buckwheat, 328
  thistles, 336
  toadflax, 1601
  tugur, 434
  Tussilago farfara, 1124
  Ward's weed, 766
  water hyacinth, 440, 1194, 1607
  wild garlic, 513, 834
  wild mustard, 893, 1126, 1190
  wild oats, 430, 828, 1008, 1009, 1121, 1190, 1378, 1481, 1533, 1538, 1600, 1601
  wild radish, 51, 331, 602
  wild safflower, 1056
  wild turnip, 331, 767, 768
  witchweed, 104, 564, 1519
  yellow foxtail, 1379
  yellow rocket, 1600
Weedone 40, 440
Western mosaic, wheat, 493
Westernwolths ryegrass—see Ryegrass
Wetting agent, Tide, 93
Wheat (*Triticum* spp.)
  after sweet clover, 459
    mulch, 458
    ploughed in, 458
  and Aldrin, 372
  and artificial rain, 853
  and CMU, 1531
  and 2,4-D, 34, 484, 585, 879, 970, 971
  and Dieldrin, 372
  and DNOC, 1330
  and green manures, 1249
  and herbicides, 483, 1601
  and light intensities, 501
  and MCPA, 34, 484, 879, 970
  and Methoxone, 35
  and sodium chlorate, 336
  and toxic gases, 795
  and ultrasonic sound waves, 780
  Asphodelus tenuifolius in, 1232
  awns and yield, 874
  bacterial disease (*Corynebacterium tritici*), 494
  baking quality and protein content, 1213
  baking quality assessment, 1213
  barnyard grass mosaic, 493
  bibliography of diseases in Brazil, 869*
  black rust (*Puccinia graminis*), 486, 1235
  black stem rust (*Puccinia graminis tritici*), 491, 871, 1230, 1236*
  boron content, 1563
  branched
    embryonic roots, 498
    nodal roots, 498
    physiology, 1613
  brown rust (*Puccinia triticina*) 13, 489*, 490
  bunt (*Tilletia tritici*), 487, 1597,
  chemical composition, Argentinian varieties, 502
  Chenopodium album in, 1232
  chinch bug (*Blissus leucopterus*), 1292
  climate and growth, 852
  cold requirement, 1242, 1243, 1244
  cold resistance, 829, 872, 878, 1240, 1241, 1243, 1244
  copper sulphate and soil acidity, 1188
  cultivation and ploughing, Scotland, 849, 851
  development and weather, 877
  diseases in Brazil, bibliography, 869*
  drought resistance, 872, 1247
  durum
    in Morocco, 1217
    varieties, 1217
  earcockle nematode (*Anguillulina tritici*), 494
  ear shortening, 19
  ear weight and seed rate, 456
  ecology, 872
  equilibrium moisture content, 478
  fertilizers, 36, 37, 38, 486, 504, 838, 855, 881, 882, 883, 1188, 1252
    and protein content, 1249
    and protein quality, 1248
    and yield, 1251
      in India, 1250
  field bindweed in, 1232
  foot rot, 13, 21, 22.
  frost damage, Italy, 465
  germinal roots, 499
  germination, 20, 372, 478, 480, 499, 506, 1188, 1227, 1230, 1327
  grain
    endosperm density, 1226*
    endosperm fissures, 1229
    fracture, 1228
    internal fissuring, 1229
    microflora, 1225
    ripening studies, 32
    water absorption, 478
  greenbug (*Toxoptera graminum*), 26, 493

green manure and protein content, 1249
green mosaic, 493
growth in sterilized soil, 505
growth stages, 972, 873
    physiology, 500*
heat-resistant varieties, 872
Helminthosporium sativum, 23, 1599
hessian fly (*Phytophaga destructor*), 492
hoeing and spacing, 462
Hohenheim collection, 877
hybrids, 866
in Australia, 863
in France, legislation, 410
in Italy, mountains, 464, 470
in rotations, 459, 475, 857
in Sahara, 1218, 1219
in Spain, 469
    classification, 1216
in USA
    Eastern, 858
    Nebraska, 124
    Texas, 1208
in USSR, 4, 461, 867, 868, 1210
irrigation, 5, 37, 476, 883, 1218, 1219
joint worm (*Harmolita* spp.), 1602
kernel characters, S. Africa, 12
kernel cracking, 1228
leaf rust (*Puccinia graminis*), 10
legislation in France, 410
lodging, 497, 1239
    -resistant varieties, 477, 872
loose smut (*Ustilago tritici*), 13, 18, 24
manganese deficiency, 1193
Medicago denticulata in, 1232
Melilotus indica in, 1232
milling quality and manures, 1188
mountain varieties, 837
New Pusa varieties, 864
nitrogen requirements, 880
NPK content, and uptake, 31, 33
origin, 495*
pantothenic acid determination, 503*
phosphorus uptake, 1331
photoperiodism studies, 29, 30, 31, 501
photosynthesis, 1245*, 1246
physiology, 1268
powdery mildew (*Erysiphe graminis*), 10, 1234
protein content
    and irrigation, 476
    and nitrogen manuring, 882
    and rotation, 458, 459
quality assessment, 1596
rainfall and tillering, 854
rainfall and yield, S. Dakota, 580
roots, cytochrome system, 496
root development and ley farming, 460
root growth and calcium, 782
rotations, 458
rust(s) (*Puccinia* spp.), 488
    P. glumarum (yellow stripe), 13, 862, 870.
    P. graminis (black), 486, 1235
    P. graminis tritici (black stem), 491, 871, 1230, 1236*
    P. triticina (brown), 13, 489*, 490
    -resistant varieties in USSR, 477
Sclerotinia borealis, 457
seed dormancy and seedling osmotic pressure, 479
seed rate, 2, 5, 123, 456, 463, 525
seed size, 1230
seed storage, 1576
seed treatment, 23, 24, 480, 481, 482, 485, 486, 494, 778, 1227, 1327, 1576
    for bunt evaluation, 487
silky bentgrass in, 1231
smuts (*Tilletia* spp.)
    T. caries (stinking), 485, 486
    T. tritici, 487
soil cultivation, 847
    and ploughing, 848, 850
sowing date, 18, 426, 457, 463, 465, 525, 1209, 1221, 1235
sown in herbage break, 1210
sown on stubble, USSR, 856, 857
spacing, 2, 462, 848, 1221
Spergula arvensis in, 1232
spike development studies, 876
stem rust (*Puccinia* spp.), 1190
    P. graminis, 13, 16
    P. graminis tritici, 10, 25
stem sawfly, 1599
stinking smut (*Tilletia caries*), 485, 486
storage, 442, 506
    pests, 1253
    treated seed, 480
streak mosaic, 1237
stubble counts, 1251
stunt, 493
sweet clover in, 1232
take-all (*Ophiobolus graminis*), 21
temperature and tillering, 854
thinning, 581
tillage and yields, 747
tillering
    and rainfall, 854
    and temperature, 854
transplanting, 581
trial plot size and shape, 807
T. durum var. Amerelejo....1215
T. hordeiforme, varieties, 1248
T. polonicum var. *ciferrii*, 1214
T. polonicum var. *tellezii*, 1214
T. spelta var. *saharae*, 1218
T. timopheevi, 871
T. vulgare var. *oasiculum*, 1218
Typhula borealis, 457
uniformity trials, USA, 807
varietal identification, France, 875
varieties, 5, 12, 410, 466,* 468, 471, 473, 483, 490, 502, 583, 584, 585, 810, 829, 862, 866, 872, 873, 877, 970, 1205, 1211, 1219*, 1221, 1245, 1246, 1331
    Africo....1215
    Alba....582, 1213
    Albidum 43....6, 18
    Albidum 3700....475
    Alsace 22....878
    Anderson....1602
    Apache....1602
    Apu....13
    Aquila....472
    Aragón 0-3....474
    Aros....491, 860, 1212
    Ås....14
    Ås II....14
    Atlas 50....858
    Atlas 66....858
    Austin....858
    Austrian White....1323
    Autonomia....464
    Banco....859
    Bansi....16
    Baxi....16
    Bellevue....1212
    Bencubbin 48....1223
    Bersée....1240
    Bersée Hybrid....1188
    Blackhawk....467, 858
    Blanka....1213
    Börsum....854
    BR. 319....455
    Brill....24, 858
    Brons....9, 10, 11, 491
    Bungulla....1223
    Butler....467, 858
    Cabezorro....474
    Candeal Alcalá....474
    Cappelle....1213
    Carala....858
    Carme....472
    Carsten's V....1213, 1240
    Ceres....837
    Chancellor....858
    Chinook....1599
    Clarkan....24, 858
    Comanche....1208
    Condestável....1215
    Cornell 595....858
    Cross 7....1202
    C.T. 186....1190
    Currell....858
    Dala....491, 854
    Dawson....858
    Derenb Silber....1243
    Diamond....13
    Diamont II....9, 964, 1322
    Dirk....8
    Dirk 48....8
    Dr. Lasser's Dickkopf....1235
    Elia....470
    Ella....10
    Ergo II....860
    Eroica....582, 859, 1212
    Eroica I....964
    Eroica II....964
    Ertus....860
    Erythrospermum 118....476
    Est 72....464
    Est × M.C.....464
    Etienne....878
    Eureka....1223
    Fairfield....467, 858
    Festival....8
    Fiorello....472
    Flint....858
    Fortunato....472
    Forward....858
    Fram II....14
    Frassineto....464
    Freccia....17, 472
    Fulcaster....858
    Fulhio....858
    Fultz....858
    Funo....472
    Fylgia I....11, 491
    Fylgia II....11, 491
    Gabo....7, 1223
    Garnet....13
    Gelchsheimer....854
    Gil Vaz....1215
    GN....871
    Goens....858
    GP....871
    Grifo....17, 472
    Halland....491, 854
    Hansa....859, 1212
    Hardired....858

    Heine 2....1240
    Heine 4....1240
    Heine 7....1213, 1243
    Hera....1213
    Hilgendorf....1202
    Holdfast....426
    Hope....837
    Hordeĭforme 10....1247
    Hordeĭforme 183/50....867
    Huron....861
    Hybrid 40....1188
    Hybrid 46....15, 426
    Hybride de Lobeau....1240
    Ideal....1212
    Impeto....472
    Insignia....1223
    Insignia 49....8, 1223
    Iskra....475
    Janetski....854
    Jubilé....1212
    Jubilegem....426
    Jubileĭnaja Osetii....477
    Juliana.... 870, 1213, 1240
    Kanred....506
    Kärn I....964
    Kärn II....9, 10, 964, 1322
    Karnatak Red....16
    Kawvale....858
    Kenphad....16
    Khapli....16
    Kitchener....475
    Kondut....1223
    Konge II....1212
    Krasnodarka....477
    Kubanskaja 133....477
    L. 1....1324
    L. 2....1324
    L. 3....1324
    Leap....858
    Leapland....858
    Leda A-47....812
    Lemhi....527
    Lichti....861
    Lusitano....1215
    Lutescens 57/46....867
    Lutescens 62....18, 460, 482, 1247
    Lutescens 758....6
    Lutescens 1163....867
    Mara....17
    Marquis....1332, 1599
    Marzatico....854
    M.C. 245....464
    Mediterranean....858
    Melanopus 37....867, 1210
    Melanopus 69....6, 18, 1210
    Melanopus 213/51....867
    Mentana....17, 465, 474
    Milturum 553....475
    Minhardi....878
    Minister....1213
    Minter....467
    Moking....858
    Morena....1215
    Moutot á Epi Rouge....878
    Narodnaja....867
    Newcaster....858
    Nigger....858
    Niphad-4....16
    Nittany....858
    Nord Desprez....15, 426
    N.P. 52....16, 29, 30, 31
    N.P. 165....29
    N.P. 710....1224
    N.P. 715....1224
    N.P. 718....1224
    N.P. 758....1224
    Nured....858
    O. 10....17
    Odesskaja 3....476, 867
    Odesskaja 12....867
    Odesskaja 16....867
    Odin....491, 860, 964
    Oestinskaja 3....477
    Osetinskaja 4....477
    Ovest....470
    Panther....8
    Pawnee....467, 492, 858
    P.C. 591....29
    Peko....1213
    Peninsular....1215
    Petit Quin Quin....426, 1594
    Piemenka....867
    Pika....13
    Pilot....15, 870, 1594
    Ponca....492, 1602
    Pondus....9, 10, 491, 964
    Poole...,858
    Prairie....858
    Préparateur....878
    Prima....1243
    Probus....464
    Progress....10
    Puora....7
    Purkof....858
    Purple Straw....858
    Pusa 4....878
    Quaderna....465
    Raisno....1215
    Ramona 44....527
    Redman,....585
    Red May....858
    Red Standard....1234
    Reldep....1222
    Renfort....1243
    Rescue....1599
    Rieti 11....464
    Rieti 210....464
    Robur....491, 860
    Roma....371
    Royal....467, 858
    Rudy....858
    Sabre....1222
    Sago....1222
    Sagres....1215
    Saline....467, 858
    Salvador....1215
    Sanford....858
    San Pastore....17, 472
    Schribaux J-1....474
    Seabreeze....858
    Seafoam....7
    Seneca....467, 858
    Senza Nome....465
    Siegerlander....878
    Sinox....1602
    Skandia....1266
    Skandia I....964
    Skandia II....964, 1252
    Skandia III 859
    Skandia III B....491, 1212
    Skirne 14
    Smena....475
    Snøgg II....14
    Sonora 37....969
    Spica....7, 1222
    Standard II....859
    Staring....15, 1213
    Stepnaja 135....476
    Sterling....21
    Stewart....585
    Supreme....858
    Sv. 01580....491
    Talberg....837
    Tammi....13
    Tenmarq....492
    Tevere....472
    Thatcher....585, 837, 871
    Thorne....858
    Timilia....854
    Trifolium 37/1167....1212
    Triumph....467, 1208
    Trumbull....858
    Uljjanovka....476
    Vahart....858
    Vigo....467, 858
    Vilmorin 23....878
    Vilmorin 27....876, 878
    Virgilio....855
    Virtus....860
    Vivenza....464
    V.P.I. 131....858
    Wagenburg....854
    Westar....467, 1208
    Wichita....1208
    Wilma....870
    Wongoondy....1223
    Yga....1188
    Yielder....1202
    Yorkwin....858
    Zemka....477
    Znaimer × Tucson....1323
    100-30....474
    100-38....474
    154-17....474
    289/48....867
    321. BT.1. B1....1220
    335....463
    375/48....867
    982....463
    2511....463
  vernalization, 28, 1329
  water requirements, 1518
  water table and root growth, 1544
  webworm (*Talis pedionoma*), 27
  weeds in, 892
  western mosaic, 493
  winterhardiness, 829
  world production, 1584
  yellow stripe rust (*Puccinia glumarum*) 13, 862, 870
  yield
    and depth of ploughing, 828
    and rainfall, S. Dakota, 580
    and soil, 855
    and soil-borne diseases, 1238*
    and soil water, 3
    and tillage, 855
    in W. Australia, 1
Wheat × *Agropyron*, 1602
  var. 22850....1247
White-fringed beetle (*Graphognathus peregrinus*), cotton, 251
White tip (*Aphelenchoides oryzae*), rice, 574
Wild beet eelworm (*Heterodera schachtii*), 181
Wild garlic in oats, 834
Wild mustard, 893
  Brassica arvensis, 1190
  B. kaber, 1126
Wild oats (*Avena* spp.), 1378, 1538
  A. fatua, 430, 1009, 1190, 1481, 1533, 1600

    seed characters and distribution in Gt. Britain, 828
    seed germination, 769
  A. fatua ssp. *cultiformis*, 1121
  A. fatua ssp. *fatua*, 1121
  A. fatua ssp. *fatua* var. *glabrata*, 1121
  A. fatua ssp. *fatua* var. *intermedia*, 1121
  A. fatua ssp. *fatua* var. *pilosissima*, 1121
  A. fatua ssp. *fatua* var. *vilis*, 1121
  A. ludoviciana,
    seed characters and distribution in Gt. Britain, 828
    seed germination, 769
  in flax, 1601
Wild radish (*Raphanus raphanistrum*) 51, 331, 602
Wild rice (*Zizania aquatica*)
  in Canada, 114
  in USA, 114
Wild safflower (*Carthamus oxyacantha*), 1056, 1607
Wild sesame (*Sesame angolense*) in N. Rhodesia, 272
Wild stokroos (*Hibiscus* spp.)
  H. cannabinus, 264, 265
  H. kitaibelifolius, 264, 265
  H. mastersianus, 265
Wild turnips
  Brassica campestris, 331
  B. tournefortii, 767
  Raphistrum rugosum, 768
Wilt
  Colletotrichum, potatoes, 1417
  Fusarium vasinfectum, cotton, 1461
  on *Lathyrus sativus*, 164
  Verticillium albo-atrum, potatoes, 1418
Wilting method, 1566
Winterhardiness, plants, 1186
Wireworms, 1193, 1575
  cereals, 584
  potatoes, 799, 828
Witches' broom, potatoes, 1425
Witchweed (*Striga* spp.)
  S. hermonthica, 104
  S. lutea, 564
    germination, 1519
    in maize, 1519
Woodpigeons, 1164
Wulfsoder pit clamp, 684
X*anthium* sp.—see Cocklebur
Xanthomonas malvacearum—see Bacterial blight
X. manihoti —see Bacterial wilt
X. phaseoli var. *sojensis*—see Bacterial pustule
Yams (*Dioscorea* spp.)
  fertilizers, 1604
  varieties, 1197
Yellow-dwarf virus, cereals, 969
Yellow foxtail (*Setaria lutescens*), 1379
Yellow rocket (*Barbarea vulgaris*), 1192, 1600
41 Yellows, sugar-beet, 631
Yellow-striped armyworm (*Prodenia ornithogalli*), cotton, 706
Yellow stripe rust, wheat, 13, 862, 870
Yellow virus diseases, sugar-beet, 828
Z*ea mays*—see Maize
Zerlate, 185, 1014
Zinc
  and cotton, 1461, 1475
  estimation in plants, 785
Zizania aquatica—see Wild rice
Zuieh, 1190

ANNUAL AUTHOR INDEX, VOL. 6, 1953

References are to abstract numbers.

Åberg, E., 1533
Abeyrathe, E., 572
Abrahão, J., 710
Abramov, Ju., 1098
Abrams, L., 823
Acharya, C. N., 1360
Af Klinteberg, H. B., 627
Agric. Gaz. N.S.W., 277
Agric. Res. Coun., 1583
Agronomia Trop., 949
Agronômico, Campinas, 781
Aguzzi, G., 544
Ahmad, N., 1450
Aitken, T. R., 585
Aiyangar, S. G., 1074
Akeley, R. V., 1420
Åkermann, Å., 11, 491, 1257
Alabama agric. Exp. Sta., 243, 253
Alabouvette, F., 72
Alaska Agric. Exp. Sta., 44
Aldrich, R. J., 1191, 1573
Aldrovandi, A., 1021, 1022, 1362, 1387
Algeria Govt Gén., 109
Allen, Ethel K., 1361
Allen, H. P., 879
Allen, S. E., 778
Allen, T. C., 353
Alphen de Veer, E. J. van, 1522
Alpine Agric. Res. Sta., Austria, 1596
Amer. Potato J., 191
Anand, D. M., 1509
Andersen, A. L., 993
Andersen, Alice M., 1305
Andersen, E. T., 1009, 1601
Andersen, S., 537, 539, 972
Anderson, G., 283, 284
Anderson, H. W., 385
Anderson, W. P., 1133
Andersson, G., 736, 913, 1445, 1493
Andrade, A. C., 710
André, E., 280, 281
Andres, J. M., 549
Andrew, C. S., 881
Andrew, R. H., 552, 1286, 1301
Andrews, F. W., 1180, 1181
Angelini, A., 249
Angulo Carpio, María Dolores, 1355
Anne, P., 1188
Annual Rev., Inc., Stanford, Calif., 421
Antal, E., 713
Antonelli, C., 1016, 1022
Antropov, V. I., 810
Ap Griffith, G., 758
Appert, J., 982
Apple, J. W., 556
Arant, F. S., 253
Archimowitsch, A. von, 654
Argentina. Minist. Agric., 1169
Arkansas Agric. Exp. Sta., 247, 339
Arvier, A. C., 907
Ash, A. G. 1454
Ashby, A. W., 289
Ashby, H. K., 578
Ashdown, D., 26, 159
Åslander, A., 504
Asselbergs, E. A. M., 675
Atkinson, R. E., 493
Atkins, R. E., 510, 896
Australia Commonw. Dep. Works and Housing, 318
Austria. Alp. Agric. Res. Sta., 1596
Avanzi, E., 652
Avdonin, H., 1100
Avery, G. S., 430
Avila, A., 502
Aycock, R., 694
Ayers, A. D., 527, 903
Ayers, G. W., 658, 1418
Azad, R. N., 202, 657
Azzi, G., 855, 872
Badruddoja, K. M., 1486
Baekgaard, H. C., 965
Bagge, H., 286
Bains, G. S., 1249
Baird, J. C., 1094
Baker, C., 1132
Baker, G. A., 541
Baker, H. V., 157
Bakhuyzen, H. L. van de S., 829
Balasubrahmanyam, R., 701, 1073
Balcom, R. B., 1191
Baldoni, R., 471
Ball, E., 347
Balls, W. L., 1586
Banasik, O. J., 70
Bandurski, R. S., 816
Barat, M. H., 955, 1314
Barber, S. A., 1193
Barbier, G., 1188
Barbosa, I., 740
Bardinskaja, M. S., 1018
Baribeau, B., 659
Barker, J., 1428
Barnes, T. W., 66
Barr, H. T., 120
Barrons, K. C., 728, 1589
Barton, Lela V., 1175, 1460, 1542
Baskin, A. D., 1072, 1191
Bassett, I. J., 1600
Bastianoni, M., 854
Basu, J. K., 755
Basutoland Dep. Agric., 837, 1201
Bath and West S. Count. Soc., 321
Batts, C. C. V., 135, 870
Bauman, L. F., 911
Baumann, H., 3
Baumgarten, G., 479
Baur, K. E., 994
Bauserman, H. M., 1370
Bavel, C. H. M. van, 309, 1581
Bayles, B. B., 858
Becker, W. R., 75
Behrens, W. U., 521
Beliz, J. M., 1215
Bellerby, J. R., 1499
Benjar, W., 1392
Bennets, H. W., 1528
Bennett, E., 938
Bensin, B. M., 44, 655
Bentley, J. A., 1143, 1144
Benvenue, A., 1319
Benvenuti, A., 673
Berg, Å., 894
Bergamo Sta. Sper. Maiscolt., 908
Berg, C. van den, 300
Bergh, H., 357
Berkner,—791
Berryman, J. W., 319
Bertrand, D., 777
Bertrand, G., 777
Bertrand, P., 570
Bertsch, K., 495
Beukering, J. A. van, 314
Bever, W. M., 24
Bhatnagar, M. P., 1224
Bhide, V. P., 164
Bianchedi, A., 915
Bibbey, R. O., 1601
Bickle, A. S., 1144
Bidwell, R. G. S., 358
Biraghi, A., 558
Bissett, W. J., 881
Bjaanes, M., 901
Blackith, R. E., 1438, 1439
Blackman, G. E., 275, 378, 1131, 1577
Black, W., 204
Blair, I. D., 1349
Blanchard, M., 130
Blaser, R. E., 1589
Blouch, R., 1014
Blumer, S., 1350
Board Agric. Anim. Husb., India, 1607
Boardman, A. H., 744
Boas, F., 1106
Bobrov, Ruth A., 520
Boerger, A., 722, 1195, 1541
Bolle-Jones, E. W., 1187
Boninsegni, S., 297
Bonjour, A., 1195
Bonnemaison, L., 799
Bonner, J., 816
Bonnier, C., 1150
Boock, O. J., 192, 193, 221, 222, 646, 665
Borro, A. P., 147
Borthwick, H. A., 69
Boswell, V. R., 936
Bottini, E., 606
Bouffil, F., 979, 989, 1347
Bousquet, M., 742
Bouyer, S., 984, 986
Bovien, P., 820
Bowen, H. D., 382
Boyd, D. A., 123
Bracci, Leda, 996
Brade, J. van den, 663
Bradley, R. H. E., 667
Brande, J. van den, 208
Brenière, J., 386
Brett, C. C., 126
Brett, C. H., 1290
Brieger, F. G., 1297
Brien, R. M., 384, 1571
Briganti, Giovanna M., 1245, 1246
Bristol. Long Ashton Agric. Hort. Res. Sta., 1187
British Association, 724
British Guiana Dep. Agric., 835
British Soc. Promot. Veg. Res., 1530
British West Indies Devel. and Welfare Org., 433
Britton, D. K., 289
Broad, P. D., 1538
Broekhuizen, S., 1240
Brøndegaard, V. J., 1062
Bronson, D. R., 1600
Brooks, J. S., 910
Brower, W., 617
Brown, C. H., 1064
Brown, D. A., 1601

Brown, J. C., 1564
Brown, J. W., 1191
Brown, W. N., 939
Bruecher, H., 1356
Bruehl, G. W., 505
Brun, L. H., 14
Brunson, A. M., 1193
Brykczyński, J., 1002
Bryssine, P., 1489
Buchholtz, K. P., 91, 430, 921, 1601
Buchinger, A., 1596
Buchli, M., 1258, 1597
Budjuk, V. P., 6
Bull. Agric. Congo Belge, 741
Bunin, V. N., 1375
Bunting, E. S., 275
Bureau, M. F., 1342
Burg, F. W. zur, 1194
Burián, A., 625
Burkart, A., 1356
Burkhardt, G., 603
Burström, H., 782
Burton, G. W., 817
Burton, J. C., 363, 1151
Burton, W. G., 229
Bussey Inst. Harvard Univ., 918
Byrde, R. J. W., 1572
Cadou, J., 1469
Calhoun, S. L., 706, 1464, 1471
Calma, V. C., 951, 1309, 1339
Calzecchi-Onesti, A., 1357
Cambridge Nat. Inst. Agric. Bot., 529
Campbell, J. D., 1226, 1457
Campbell, S. C., 1394
Campbell, W. V., 707
Canada Dep. Agric., 1054, 1160, 1599
Canada. East. Sect. Nat. Weed Cttee, 1600
Canada. Manitoba Dep. Agric., 1190
Canada. Ontario Dep. Agric., 429
Canad. Seed Gr. Ass., 368
Canada. West. Canad. Weed Contr. Conf., 1601
Cañamás, R., 1236
Candioli, P., 1113
Canel, M., 1195
Capinin, J. M., 154
Capo, B. G., 108
Carboni, G., 637
Carilli, A., 765
Cariss, H. G., 2
Carpenter, R. W., 33
Carpio, María Dolores A., 1355
Carrisso, L. W., 407
Carter, D. G., 599
Caruso, S. A., 232
Carver, W. A., 833
Casida, J. E., 353
Casseres, E. H., 656
Castellani, E., 122
Castells, R., 727
Castle, M. E., 640
Castro, J. B. de, 221
Cavanillas Rodriguez, L., 1355
Cavia, C. E., 201, 232
Cent. Inst. Agric. Res., Netherlands, 829
Cepero, P., 473
Čerednicenko, S. V., 1210
Černenkov, A. D., 620
Ceylon Dep. Agric., 954
Ceylon Dir. Agric., 840
Chabannes, J., 1188
Chandnani, J. J., 245
Chandraratna, M. F., 577
Chang, Annie T., 1562
Chapman, L. J., 1103
Chappell, W. E., 597, 834
Chevalier, A., 1065, 1523
Chhotey Singh, 1470
Chiang, H. C., 1289
Chibber, R. K., 1114
Chinoy, J. J., 29, 30, 31
Chiuderi, A., 297
Chouard, P., 420
Christopher, E. P., 1300
Church, B. M., 750
Ciaffi, B., 622
Clark, H. E., 976
Claver, F. K., 199
Clydesdale, C. S., 273
Cobb, J. S., 1191, 1416
Cockbill, G. F., 798
Cockerham, K. L., 236
Cock, R. E., 331, 1529
COCOBRO Inst., Wageningen, 1235, 1240, 1241, 1242, 1243, 1244, 1558
Coïc, Y., 515, 880, 1188
Coile, T. S., 1589
Coleman, N. T. 1589
Coleman, P. G., 950
Collins, W. B., 1531, 1600
Collister, E. H., 41
Collot, L., 984
Colon. Devel. Corp. Gt. Britain, 1593
Colon. Pl. Anim. Prod., 1083
Colorado Agric. Exp. Sta., 647
Combs, J. B., 1168
Comm. Bevorderung Suikerbietenteelt Noord. Prov., Netherlands, 830
Comm. Hydrol. Res. T.N.O., 1254, 1504, 1544
Commonwealth Dep. Works and Housing, Australia, 318
Commonwealth Econ. Cttee, 1584
Compton, Winifred, 160
Conagin, A., 403
Consolini, A., 17
Conway, Elsie, 325
Cook, G. W., 995
Coonrod, L. G., 120
Coons, G. H., 630
Coppenet, M., 671, 1188
Copp, L. G., 1349
Corcelle, P., 1449
Cordner, H. B., 159, 1050
Cormack, R. G. H., 328
Cormany, C. E., 1369
Cornell Univ. Agric. Exp. Sta., 650
Corns, W. G., 771
Corriols, F., 944
Cortabarria, Olga C. da, 1195
Costa, J. J., 485
Costa Neto, J. P. de, 869
Coton et Fibr. Trop., 1447
Couto, F. A. A., 194
Covas, G., 533
Cowart, L. E., 834
Cox, H. C., 372, 1292
Coyaud, Y., 568
Coyola, G., 551
Crabb, G. A., 747
Cralley, E. M., 574
Crane, P. L., 1284
Créhu, G., 716
Cressey, G. B., 1090
Crijns, A. H., 682
Crocker, W., 1175
Cromie, A., 1095
Cronshey, J. F. H., 1181
Crowther, E. M., 746
Cruickshank, I. A. M., 729
Cruzado, H. J., 335, 834
Cuany, R. L., 258
Cuaresma, F. M., 951
Culbertson, J. O., 1053
Cullen, J. C., 1410
Cunningham, H. S., 1036
Cutkomp, L. K., 1289
Cutler, G. H., 594
Czech, M., 795
Da Costa Neto, J. P., 869
Dadant, R., 1444
Dadd, C. V., 995
Dales, H., 1539
Da Mota, F. S., 738
Danell, N., 721
Danfiño, D. S., 485
Danielson, L. L., 1191
Danilovová, T. D., 1375
Dantuma, G., 1241, 1242, 1243
Darling, H. S., 145
Da Silva, A. R., 49
Dastur, R. H., 244, 1071, 1451, 1475
Datta, C., 1315
Daulton, R. A. C., 797
Datta, S. C., 1140, 1141
Datta, P. K., 1315
Dauphin, J., 128
Davis, A.C., 1351
Davis, D., 1163
Davis, J. F., 1046
Davtjan, G. S., 857
Debenham, F., 759
De Castro, J. B., 221
Decker, G. C., 86, 1293
De Cortabarria, Olga C., 1195
De Fina, L., 727
De Haan, H., 1325
De, H. N., 1140, 1141
De Jonghe, P., 360
De Jong, W. H., 643, 829
Delanoue, P., 612
Delattre, R., 1449
Delmas, L., 1188
Delone, L. N., 868
Del Rivero, J. M., 702
Demel, Johanna, 1411, 1596
Dementjev, P. F., 111
Demidov, S., 1078
Deming, G. W., 1372
Den Hartog, G. T., 1276
Denmark. Statens Forsøgsvirk Plantekult., 227, 523, 531, 534, 623, 624, 639, 720, 723, 1055, 1212, 1252, 1265, 1266, 1272, 1488
Dep. Census and Statist., N.Z., 443
Dep. Sci. Industr. Res., Gt. Britain, 1436
Dep. Sci. Industr. Res., N.Z., 384, 1202
Derscheid, L. A., 538
Desai, S. V., 361
Deshpande, R. B., 1056
De Soares Telles, Inés P., 473
De Sousa, O. F., 733
De Sutter, R., 292
Desveaux, R., 1494
Detroux, L., 133, 1079
Development and Welfare Org., B.W.I., 433
De Vries, D. M., 829
De Wit, C. T., 355
De Zeeuw, D. J., 993
Dhande, G. W., 164
Dickson, A. D., 900
Dickson, T. B., 528
Diehl, R., 716, 878

Dijkstra, H., 649
Dimond, A. E., 1163
Dingley, Joan M., 384, 1571
Dionigi, A., 470
Dir. Res. and Special. Servs, 437
Ditman, L. P., 603
Dobben, W. H. van, 829, 1321
Dobrenov, M., 1427
Dodds, K. S., 1407
Dolan, D. D., 1300
Dolgopolov, N. N., 780
Doornik, A. W. van, 543
Downie, A. R., 1379
Doxey, D., 1556
Doxtator, C. W., 1370
Doyle, E. J., 1327
Dreibelbis, F. R., 1518
Dricot, C., 142
Drozdov, S. N., 507
Dubus, M., 332
Ducker, H. C., 241
Duckham, A. N., 408
Duffield, P. C., 553
Dunham, R. S., 430, 1126, 1601
Dunnam, E. W., 1464, 1471
Du Plessis, S. J., 21
Dupuis, M., 1188
Du Toit, J. J., 235
Dutt, B. K., 1414
Dutton, W. C., 430, 1601
Duuren, A. J. van, 1013
Duvick, D. N., 927
Dvorcova, E. I., 804
Dykyj-Sajfertová, D., 779
EAAFRO, 436
Eadie, I. McL., 1120
Earley, E. B., 97, 560, 598
Easley, L. W., 1191
East Malling Commonw. Bur. Hort. Plant Crops, 419
East Sect. Nat. Weed Cttee, 1531, 1600
Eastwood, C. G., 1155
Eastwood, T., 672, 1191, 1416
Eaton, F. M., 1075
Ebbe-Nyman, Elene, 1059
Ebso, H., 1230
Eden, W. G., 88, 89, 925, 1302
Edgar, A. D., 223
Edinburgh and E. Scot. Coll. Agric., 402
Edwards, P. W., 233
Eggink, H. J., 158, 829
Ehrenberg, P., 349
Ekern, P. C., 1117
Eliasson, S., 1273
Elle, T., 63
Elliott, B. B., 891
Elliott, C. S., 274, 870
Elliott, F. C., 807
Ellis, B. S., 542
Ellison, J. H., 206, 686
Ellison, W., 1176
Elomaa, A., 966
El Saifi, A. F., 1428
Emilsson, B., 230, 1421
Empire Cott. Gr. Corp., 832
Engelj, O. S., 676
England and Wales. Minist. Agric. Fish., 144, 186, 323, 324, 365, 383, 389, 397, 425, 590, 638, 1183, 1419, 1535
Entenmann, F. M., 459
Epstein, E., 1145
Ercilla, C. A. L., 271
Erdmann, K., 176, 177
Ergle, D. R., 1075, 1077
Erinç, S., 295
Ernould, L., 629
Erroux, J., 129, 1218, 1219
Esc. Agric. Queiroz, 1297
Eshuis, J. A., 303
Esteves, I. A., 1239
Etchebarne, J., 551
Evans, H. J., 1341
Evans, J. W., 826
Evans, L. S., 1194
Everett, C. F., 1531, 1600
Eversen, L. E., 1126
Ewing, K. P., 1463
Ezell, B. D., 697
Fajersson, F., 9, 10, 859, 860
FAO, 322, 391, 392, 579, 1585
Farkas, G., 1153
Farm Chem., 787
Farmer, B. H., 754
Farmers' Weekly, Bloemfontein, 1519
Farm Home Res., 546
Farnworth, Constance A., 1104
Farwell, G., 1307
Fassetta, L., 315
Feazell, G. D., 1441
Fed. Exp. Seed Contr. Sta., Switz., 1189
Feekes, W., 1235
Feldman, A. W., 772, 834
Fenaroli, L., 115, 908, 914
Fense, H., 171
Ferguson, L. A. C., 563
Fernando, L. H., 703
Fernhurst Res. Sta., Haslemere, 1181
Ferrari, T. J., 1255
Feuell, A. J., 270
Fiddian, W. E. H., 1025
Fife, L. C., 252
Fifield, C. C., 506
Filippovič, I. I., 1268
Fina, L. de, 727
Finker, R. E., 1260
Finnerty, D., 430
Finney, D. J., 1185
Firth, D. H., 1093
Fischer, G. J., 486, 1195
Fischnich, O., 1415
Fisher, D. J., 895
Fison, E. Ltd., 899
Flamini, B., 619
Flamini, S., 1576
Flock, A., 337
Florida Agric. Exp. Sta., 833
Florida Soil Sci. Soc., 1194
Fokeev, P. M., 1109
Folkes, B. F., 536
Forlani, R., 472
Forte, P. N., 27
Forti, G., 668
Forward, Dorothy F., 1043
Fraassen, A. M. van, 762
France. Inst. Nat. Rech. Agron., 1188
Francesconi, F., 1023
Francis, F. J., 675
Frankton, C., 771
Fransen, J. J., 375
Frans, R. E., 1191, 1573
Frear, D. E. H., 1591
Frederiksen, S., 1482
Freeman, J. A., 591
Freiberg, S. R., 152, 976
French Sudan. Serv. Agric., 1603
Frey, E., 1597
Frey, K. J., 71, 890, 1280
Friederich, J. C., 829
Friesen, G., 430
Fröier, K., 1274
Frokontrollanst., Stockholm., 1230
Fromm, F., 341
Fuchs, H., 1596
Fuggles-Couchman, N. R., 957
Fuller, H. J., 783
Fults, J. L., 185, 678
Fung. Insect. Res. Co-ord. Serv., 1377
Gaastra, P., 829
Gadd, I., 369
Gadea, M., 469
Gadkari, P. D., 255
Gaines, J. C., 250, 377, 705, 1465, 1466
Gaines, R. C., 1473
Galinat, W. C., 1286
Galjčenko, I. N., 497
Gallup, A. H., 1532
Gantioqui, L. L., 1309
Garay, A., 713
Garber, K., 1088
Garese, P., 23
Garey, C. L., 1193
Garner, F. H., 1492
Gaskill, J. O., 175, 1395
Gassner, G., 479
Gates, L. F., 1388
Gavrielit-Gelmond, C., 1000
Geering, Q. A., 567
Gelin, O., 991
Gelin, O. E. V., 514
Geluwe, J. van, 893, 1191
Gentilli, J., 1
Gerhold, N. R., 1380
Gerretsen, F. C., 1589
Geslin, N., 852
Gfroerer, E., 196
Gheorghianov, V., 1195
Ghillini, C. A., 1010
Giardini, A., 621
Gilbert, F. A., 1589
Gilbert, N. E. G., 1578
Gilliard, R., 561
Gillier, P., 155
Ginsburg, J. M., 87
Giovanoli, P. Elisa, 1429
Giraldi, G., 1012
Gita Sen, 1084
Gladkiĭ, P. P., 731
Gleason, H. A., 790
Gliemeroth, G., 39, 40, 613
Glover, J., 930, 931
Glynne, Mary D., 1238
Go Ban Hong, 1344
Godunova, K. N., 5
Goedewaagen, M. A. J., 1544
Goerlitz, H., 1030
Gokhale, V. P., 16
Goldberg, R. A., 1174
Gold Coast Dep. Agric., 836
Gončarik, M. N., 1032
Gonggrijp, J., 773
Gopalkrishnan, K. S., 1159
Gopani, D. D., 244, 1451
Gottlieb, D., 385
Gould, G. E., 1193
Gounty, P., 1188
Govinda Rajan, S. V., 962
Govrie, R. M., 756
Govt Cttee Comp. List Fld Crop Vars, Neth., 395
Graf, A., 1596
Graham, T. G., 1308
Graham, T. W., 1468
Gram, E., 820

Granö, O., 1505
Gt. Britain. Colon. Devel. Corp., 1593
Gt. Britain. Dep. Sci Industr. Res., 1436
Gt. Britain. Nat. Inst. Res. Dairy., 1592
Green, J. M., 248, 430
Green, V. E., 576
Greenwood, Mary L., 689
Gregory, F. G., 1269
Gries, G. A., 1601
Griffith, G. ap, 758
Grigorjeva, V. G., 904
Grillot, G., 463, 952, 1217
Grobbelaar, W. P., 564, 1303
Groenman, S., 306
Groom, J. L., 273
Grooten, R., 293
Guard, A. T., 92
Guernsey, F. C., 1193
Guevara, V. F., 154
Guha Thakurta, A., 1414
Guillemin, R., 600
Gunar, I. I., 500, 734
Gupta, J. C. Sen, 1084
Gurčenko, V. S., 475
Gustafson, F. G., 1352
Guyot, L., 871
Guzovskiĭ M., 166
Gwinn, A. B., 648
Haagen-Smit, A. J., 794
Haan, H. de, 1325
Haarer, A. E., 267, 412
Haas, H. J., 1543
Haasjes, K. H. S., 1148
Haber, E. S., 937, 1593
Hackett, D. P., 1431
Hac, Lucile R., 1399
Haensel, H., 897, 1596
Hagberg, A., 1267
Hagberth, N. O., 45
Hagood, E. S., 834
Haigh, J. C., 819
Halden, W., 1142
Hall, C. B., 833
Haller, H. L., 1195
Hall, W. C., 712
Halverson, A. W., 68
Hammack, J. A., 1194
Hammer, O., 1135
Hanks, R. J., 308
Hansch, C., 1557
Hansen, B., 35
Hansen, C. M., 1400
Hansen, F., 1435
Hansen, J. R., 91, 430, 921
Harder, A., 1350
Hargrave, J., 1502
Harland, S. C., 1554
Harper, H. J., 817
Harrington, J. B., 1334
Harris, L., 1385
Harrison, A. L., 1346
Harrison, P. K., 236
Harris, R. H., 70
Harrold, L. L., 1518
Hartog, G. T. den, 1276
Hartsuijker, K., 632
Hartwig, E. E., 974
Harvard Univ., Bussey Inst., 918
Harvey, P., 169
Harvey, P. N., 414
Harvey, W. A., 116
Haslemere, Fernurst Res. Sta., 1181
Haughs, M. A., 1498
Hausen, S. S. von, 604
Hauser, E. W., 975, 1601
Hawaii Agric. Exp. Sta., 1562
Hawkes, J. G., 1407
Hayes, G. G., 290
Haylett, D. G., 1514
Hayot, H., 739
Hayward, P. R., 426, 1594
Hay, W. D., 279
Hedin, L., 926
Hegarty, A., 1105
Heick, F., 753
Heinisch, O., 1005
Hemberg, T., 200, 997
Hende, A. van den, 360
Henderson, C. F., 251
Henderson, S. M., 398
Hendricks, S. B., 1564
Henkel, P. A., 1154
Henriet, J., 1161
Hercher, P., 569
Hermida, E. V., 732
Hernandez, T. P., 692, 834
Hernes, O., 48
Hewitt, E. J., 419, 1187, 1565
Hey, A., 1423
Higgins, B. B., 1173
Highlands, M. E., 677
Hijner, J. A., 181
Hildebrand, A. A., 182
Hill, A. F., 822
Hill, K. W., 1364
Hills, F. J., 1376, 1397
Hill, W. W., 1517
Hilton, N., 1092
Hingorani, M. K., 494
Hinkle, D. A., 339, 834
Hirt, W., 1034
Hobbs, J. A., 1251
Hodges, D. J., 427
Hoehener, H., 1125
Hoek, C. von, 1172
Hofmeyr, J. D. J., 545
Hofsten, C. G. von, 1534
Hokkaido Nat. Agric. Exp. Sta., 1340, 1425
Holdeman, Q. L., 1468
Holman, L. E., 599
Holmes, E., 1181
Holm, L. C., 1601
Holstun, J. T., 704, 834
Honkavaara, T., 13
Hooghoudt, S. B., 302, 1504
Hooker, W. J., 205
Hooper, A. Dorothy, 390
Horber, E., 388, 1597
Hörberg, Y., 62, 1058
Horring, J., 1500
Hoshaw, R. W., 92
Hoskins, W. M., 381
Housley, S., 1143
Houston, B. R., 969
Hoyman, W. G., 214
Huber, L. L., 1285
Huebner, R., 512, 1546
Huelsen, W. A., 939, 1299
Hughes, M. B., 694
Hull, H. M., 1396
Hull, R., 1388
Hunt, C. H., 96
Hunter, G. J., 1261
Hunter, H., 411, 906
Hunt, K. E., 399
Hurlbut, L. W., 143
Hutchinson, J. B., 1259
Hutchins, R. E., 707
Hutton, E. M., 213
Ichinohe, M., 1340
Idnani, M. A., 1114
Ikeuchi, Y., 1477
Ildis, P., 1048
Iljin, W. S., 1551
Illinois Agric. Exp. Sta., 84, 467, 599, 911, 912, 939, 1193, 1284, 1560
Imper, A. D., 1498
India. Bd Agric. Anim. Husb., 1607
Indiana Agric. Exp. Sta., 594, 1193
INEAC, 1179, 1197
Inst. Agrarian Affairs, 307
Inst Agric. Res. Tohoku Univ., 1270, 1277, 1317, 1318, 1432
Inst. Nat. Rech. Agron., 1188
Inst. Res. Fld Crop Vars, Neth. 1444
Inter-Amer. Agric. Conf., 1195
Internat. Seed Test Ass., 370
Irion, W. von, 1415
Irvine, F. R., 1587
Isely, D., 83, 1326
Ishaque, M., 1486
Ivanov, S. S., 50
Ivy, E. E., 1068
Iwersen, J. 760
Jacks, H., 1158, 1536
Jacobson, G., 276, 1124, 1273
Jacob, W. C., 188, 1191, 1406
Jaehnl, G., 645, 1367, 1403, 1405, 1413, 1596
Jagannatha Rao, C., 1456
Jakhanwal, G. P., 287
Jakimenko, A. F., 942
Jameson, D., 1448
Jameson, H. R., 1047
James, R. W., 708
Jansen, J. H., 310
Jansson, S. L., 336
Jarman, C. G., 270
Jarmizin, D. V., 811
Jaubert, P., 980, 983, 1347
Jayabhima Rao, K., 616
Jenkins C. F. H., 27, 800
Jensen, H. L., 803
Jensen, N. F., 589
Jensen, W., 261
Jewett, H. H., 90
Jewitt, T. H., 1076
Jeyaseelan, K. N., 239
Joham, H. E., 1476
Johnson, Betty R., 1561
Johnson, C. M., 1147
Johnson, H. W., 974
Johnson, W. B., 938
Johnston, H. W., 346
Jonard, P., 410, 876
Jones, C. R., 1226
Jones, E. W., 1383
Jones, J. W., 948
Jones, P. J., 46
Jonghe, P. de, 360
Jongh, G., 1213
Jong, W. H. de, 643, 829
Jorritsma, J., 170
Joshi, V. K., 1452
Joubert, C. J., 801
Journal Dep. Agric. Eire, 456, 468, 584
Judenko, E., 162
Jugendheimer, R. W., 1283
Juillet, A., 1087
Jump, J. A., 1159
Justice, O. L., 366
Kalbfleisch, W., 138
Kammacher, P., 1469
Kanniyan, K., 701, 1073

Kanno, C., 1060
Kanwar Singh, 1475
Kapoor, S. L., 197
Karr, E. H., 1454
Karska, K., 875
Karuzin, B. V., 856
Katô, J., 1270
Kaudy, J. C., 179
Keilbach, R., 666
Keller, C., 861
Keller, E., 1597
Keller, E. R., 1166, 1167
Kelly, A. F., 47, 888, 889
Kennedy, E. J., 231
Kentucky Agric. Exp. Sta., 90
Kenya. Afr. Land Util. Settlem., 1199
Kerle, W. D., 917
Kerr, D., 737
Kicelev, N. N., 1186
Kidd, F., 1049
Kiesselbach, T. A., 124
Kiffmann, R., 611
Kikuchi, M., 1477
Kimura, J., 1317, 1318
King, L. J., 770
K. I. O. Fortnightly, 557
Kipps, M. S., 1588
Kiričenko, F. G., 867
Kisljuk, M. M., 28
Kizima, P. N., 883
Kjaer, A., 131
Klapp, E., 681
Klečka, A., 57
Klein, W. H., 374, 1552
Klingman, G. C., 513, 834, 1345
Klinkowski, M., 683
Klinteberg, H. B. af, 627
Kljuškin, E. A., 1099
Kloen, D., 626, 1027
Knight, R. L., 254
Knowles, G., 1600
Koch, L. W., 182
Koehnlein, J., 171
Koennecke, G., 748
Kogane-Charles, M., 1494
Kolk, H., 1230
Kolocov, I. I., 498
Kondo, Y., 960
Kooi, I., 831
Koritz, Helen, G., 1568
Kornilov, A. A., 43
Kostrubin, M. V., 1080
Kozlova, E. N., 804
Kozubenko, V. E., 79
Kozyrj, A. I., 103
Kramer, C., 59, 831
Kramer, H. H., 41
Krastina, E. E., 500
Kress, H., 1329
Krimgold, D. B., 752
Krueger, F. H., 680
Krug, H. P., 922
Kruijne, A. A., 761
Krutihovskiĭ, V. K., 99
Kudrjašova, K. E., 18
Kugler, W. F., 260
Kuiper, N. H., 1165
Kunkel, R., 224, 647
Kurir, A., 968
Kurtz, T., 757
Kuthy, S., 882
Kuvšinov, I., 1110
Laby, H., 109
Lake Alaotra Agric. Exp. Sta., Madagascar, 440
Lakon, G., 132
Lal, K. B., 1470
Lal, K. N., 359
Lambert, J. W., 1276
Lambou, M. G., 1459
Lammers, R. P., 1348
Lana, E. P., 937
Landrau, P., 237, 696
Lane, F. W. J., 1181
Lane, H. C., 712
Lange, W. H., 1575
LantbrAkad. Kom. Ekon. Forskn., 1107
Lanza, F., 37, 99, 317
Large, E. C., 203
Laričeva, M. D., 866
L'Arrivee, J. C. M., 1601
Larsen, A., 718
Larson, Sara, 592
Larson, W. L., 522
Lasskiĭ, F. I., 1186
Last, F. T., 1234
Laubscher, F. X., 916
Laumont, P., 109, 130
Lavers, D. W., 1527
Leach, L. D., 1376
Lear, B., 664
Lebeau, F. J., 105
Ledingham, R. J., 1228
Leefe, J. S., 602
Lefebvre, J. M., 926
Lefort, M., 1487
Leggett, H. W., 1601
Lenhard, G. von, 1567
Leonti, F., 920
Leopold, A. C., 374, 891, 1193, 1552
Lerman, R. I., 517
Leukel, R. W., 945
Levitt, J., 674, 1042
Lilly, J. H., 372, 1292
Limfat, E., 1085
Lind, E. F., 1550
Linder, P. J., 1191
Lindsay, D. R. 1121, 1600, 1601
Linser, H., 1134
Linskens, H. F., 481, 1227
Lisoval, P. Z., 1024
Littler, J. W., 1308
Litzenberger, S. C., 44
Løddesøl, A., 824
Loisil, L., 952
Lona, F., 1041, 1429
Long Ashton Agric. Hort. Exp. Sta., 895
Longchamp, R., 483, 484, 970, 971, 1526
Lööf, B., 913
Loomis, W. E., 1127
Lovčikov, I. S., 6
Løvø, P. J., 1275
Lownsbery, B. F., 662
Lowry, W. L., 706
Lubatti, O. F., 1439
Luckmann, W. H., 86
Luedecke, H., 149, 618
Lugt, C., 1321
Lundegårdh, H. 496
Lutz, J. M., 685, 699
Lynch, D. L., 148
Lyness, W. E., 124
Lyons, J. C., 598
Mabbt, L. A., 1333
McCall, G., 430
McCall, G. L., 334, 1600
McCall, W. W., 1046
McCollam, M. W., 1146
McCoy, T. A., 1262
McDonald, W. P., 1601
McFarlane, J. S., 1368
McGregor, C. J., 264
McGregor, W. G., 279, 1054, 1354
Machacek, J. E., 480
McIlrath, W. J., 1077
McIntosh, T. P., 195
McKay, H. C., 458
McKey, J., 11
McKindlay, K. S., 714
McKinstry, A. H., 708
MacLachlan, D. S., 215, 1440
MacLagan, Govrie, R., 756
McLeod, Anna M., 65
McMillan, J. A., 817
McQueen, G. R., 1398
McRostie, G. P., 1600
Madagascar. Lake Alaotra Agric. Sta., 440
Madras Dep., Agric., 441, 839
Magee, A. I., 138
Mai, W. F., 209, 662
Maksimov, N. A., 1139
Malato-Beliz, J., 1214, 1215
Malay. Agric. J., 700
Maliani, C., 462
Malygin, V., 1003
Malyšev, A. A., 1138
Manitoba Dep. Agric., 1190
Mann, H. H., 66
Mansfeld, R., 532
Marchi, V., 1540
Marciote, C. V., 260
Maree, H. J., 1221
Margara, J., 1382
Marillonnet, L., 1503, 1116
Marimpietri, L., 36
Marinari, Anna, 1011
Marrè, E., 1296
Marsella, R., 606
Marshall, E. R., 893, 924, 1191
Marsh, R. W., 340
Marth, P. C., 687
Martinez, E. J., 490
Martin, H., 1160
Martin, R. P., 1278
Martin, W. P., 404
Masefield, G. B., 614
Massenot, M., 871
Massey, P. H., 212
Massin, P. L., 1343
Mast, A.A., 1386
Matsuo, T., 1311
Mazoyer, — 1188
Medina, J. C., 266, 269
Mehlich, A., 1589
Meiklejohn, A. K. M., 528, 751
Melhus, I. E., 1320
Melis, A., 1011
Melo do Nascimento, F., 1458
Meloni, U., 82
Melsted, S. W., 1294
Merendi, A., 1096
Mericle, L. W., 1294
Mes, Margaretha G., 1287, 1288
Metge, R., 313
Meudt, W., 1553
Michael, R., 691
Miczyński, K., 509
Middlekauff, W. W., 1335
Miège, E., 246
Mikell, J. J., 1442
Mikenberg, N., 502
Mikkelsen, D. S., 635

Mikuljskiĭ, A. A., 218
Miles, J. R. W., 1160
Millaud, R., 1443
Miller, B. S., 503
Miller, J. H., 1462
Miller, M. W., 992, 1191
Miller, P. A., 928
Milne Home, J. H., 326
Milne-Redhead, E., 406
Milner, M., 1229
Minakov, N. N., 156
Minist. Agric. Argentina, 1169
Minist. Agric. Fish. England and Wales, 144, 186, 323, 324, 365, 383, 389, 397, 425, 590, 638, 1183, 1419, 1535
Minist. Agric. N. Ire., 190, 427, 1256, 1402
Minist. Agric. Republ. Ire., 428
Minist. Agric. Sudan, 434
Miržinska, Y., 1209
Misra, G., 1316
Missouri Agric. Exp. Sta., 61
Mistric, W. J., 377, 1465, 1466
Mitchell, J., 588, 1331
Mjagkov, N. V., 4, 566
Mohrmann, K. J. M., 304
Molfino, R. H., 320
Montaldo, A., 207
Montanari, V., 77, 316, 1112, 1281
Montenegro, W. S., 922
Mon. Rep. Minist. Agric. N. Ire., 190
Montevideo. Inter-Amer. Agric. Conf., 1195
Moore, A. M., 1483, 1484
Moore, C. W. E., 516
Moore, H. I., 423
Moore, R. M., 776
Morani, V., 1023
Morozova, N. P., 184
Morozov., P. V., 32
Morris, G. P., 15
Morrison, S. R., 1306
Morrow, W. B., 1386
Mota, F. S. da, 738
Muehleisen, R., 161
Mueller, D., 905
Muenster, J., 1189, 1422
Muir, R. M., 1557
Mulder, E. G., 1589
Mulvey, R., 1193
Muncie, J. H., 661
Mundy, H. G., 1508
Muñoz-Orozco, E., 1524
Muntañola, Maria, 107
Muntona, Ltd., 899
Muravěv, V. A., 628
Murneek, A. E., 1296
Murphy, H. C., 510
Muzik, T. J., 335, 834
Myers, Amy, 1157
NAAS Quart. Rev., 1152
Naik, R. J., 1067
Naldi, L., 548
Nanda, K. K., 29, 30, 31
Nascimento, F. M. do, 1458
Nason, A., 1341
Nat. Cttee Malt. Barley, Neth., 831
Nat. Inst. Agric. Bot., 529
Nat. Inst. Agric. Engng, 137, 139, 140, 141
Nat. Inst. Res. Dairy., Reading. 1592
Nattrass, R. M., 554
Naundorf, G., 573
Nawrocki, Z., 518
Nayak, H. R., 256
Nayar, K. V. N., 255
Nebraska Univ. Agric. Exp. Sta., 124
Neethling, J. C., 1506
Nehring, K., 581
Neky, E., 1324
Nelson, C. E., 562
Nelson, R. T., 1008, 1372, 1378, 1601
Nemčin, F. I., 641
Netpune, G., 919
Netherlands. Cent. Inst. Agric. Res., 829
Netherlands. Comm. Bevorderung Suikerbietenteelt Noordelijke Prov., 830
Netherlands. Govt Cttee Comp. List Fld Crop Vars, 395
Netherlands. Inst. Res. Fld Crop Vars, 1404
Netherlands. Nat. Cttee Malt. Barley, 831
Neto, J. P. da Costa, 869
Netto, J. A. S., 110
Netto, J. E. P., 193
Neumark, S. D., 296
New Jersey Agric. Exp. Sta., 431
New South Wales Dep. Agric., 442
Newton, W., 660
New Zealand. Dep. Census and Statist. Official Yearb., 443
New Zealand. Dep. Sci. Industr. Res., 384, 1202
Nicholas, D. J. D., 540, 895
Nicholson, G., 55
Nicholson, H. H., 1093
Nickell, L. G., 330, 430
Nielsen, H. M., 352
Nielsen, K. F., 1298
Nielsen, L. W., 1052
Nigeria Dep. Agric., 1604
Nijdam, F. E., 831
Nilova, V. P., 489
Nissen, O., 401
Nitta, K., 151
Noda, K., 1432
Norden, A. J., 95
Norfolk Agric. Exp. Sta., 414
Norman, A. G., 817, 1589
Normand, W. C., 834
Normanha, E. S., 238
North, C., 1446
North Cent. Weed Contr. Conf. U.S., 343, 430
North Cent. and W. Canad. Weed Contr. Conf., 1601
Northeastern Weed Contr. Conf., 1191, 1192
Northern Ireland. Minist. Agric., 427, 1256, 1271, 1402
Northern Rhodesia Dep. Agric., 1605
North Scot. Coll. Agric., 1498
Nortjé, J. H., 21
Nothdurft, W., 795
Noulard, L., 34
Novero, R. P., 961
Novskov, F., 1510
Nowotny-Mieczyńska, A., 364
Nuckols, S. B., 1001
Nuernberg-Krueger, U., 898
Nuttonson, M. Y., 409
Nyasaland Agric. Quart. J., 81, 102, 112
Nyasaland Dep. Agric., 242, 438, 1606
Nybom, N., 902
Oakland, G. B., 808
Ochoa, C., 1033
Oehler, E., 1189
Ogle, W. L., 695
Ogolevec, G. S., 1186
Ohlrogge, A. J., 1560
Okajima, H., 1317, 1318
O'Kelly, J. C., 1478
Oklahoma Agric., Exp., Sta., 248, 910, 1050, 1457
Oleĭnikova, T. V., 789
Olesen, J., 1264
Oliva, A., 464
Oliver, W. F., 784
Olson, P. J., 430, 1601
Olsson, G., 1061
Onofry, A., 1495
Ontario Dep. Agric., 429
Opitz, K., 717, 749,
Orchard, H. E., 767
Ordish, G., 418
Oregon Agric. Exp. Sta., 432, 1517
Orgias, A., 155
Orlovskiĭ, N. I., 178, 1020
Orsenigo, J. R., 1122, 1191
Ossenwaarde, J. G., 265
Oswald, J. W., 969
Owen, C. W., 1338
Owen, P. C., 20, 478
Oyer, E. B., 329, 430
Ozolinš, J., 892
Paatela, J., 1006, 1322
Paauw, F. van der, 1254
Padwick, G. W., 415
Painter, R. H., 492
Pakistan Govt Co-op. Market. Adviser, 1590
Pal, B. P., 864
Pammer, F., 1323, 1596
Panse, V. G., 715
Papadakis, J., 1177, 1178
Paredes, A., 396
Parencia, C. R., 1463
Parker, C., 1377
Parks, R. O., 817
Passlow, T., 730, 1328
Patel, C. T., 1066
Patel, G. B., 1066
Paterson, D. R., 688, 1437
Patterson, R. H., 318
Paul, D. L., 941
Payne, Merle G., 219
Peacock, F. C., 1047
Peak, A. R., 213
Pearce, J., 312
Pearman, R. W., 272
Pearsall, L. W., 690
Pearson, P. B., 1589
Peck, N. S., 834
Peiris, J. W. L., 119
Pelissier, J., 978, 987,
Pendleton, J. W., 467, 912
Pendleton, R. A., 1373
Pengra, R. F., 580
Penman, H. L., 173
Pennsylvania State Coll. Agric. Exp. Sta., 1285
Pereira, A. S., 238
Pereira, J. Pizzorno, 486
Perepičko, N. P., 1186
Péronet, A., 607
Pesola, V. A., 13
Peters, E. H., 653
Petersen, H. I., 803
Petersen, H. L., 788
Petersen, P., 636

Peterson, C. E., 648
Peterson, D. F., 1369
Peterson, L. C., 209
Petersson, G., 1412
Peto, F. H., 1391
Pfeiffer, Hildegard, 526
Pfeiffer, R., 583, 1324
Philipson, T., 1563
Phillips, R. W., 1569
Phillips, W. M., 387
Piacco, R., 571, 959
Pichler, F., 1596
Pinevič, V. V., 1248
Pink, H. S., 907
Pisarev, V., 461
Pissot, P., 1497
Piunovskiĭ, B. A., 345
Pizzorno Pereira, J., 486
Plant Dis. Reptr, 805
Plant Protect. Ltd., 818
Platzer, S., 684
Plessis, S. J. du, 21
Poehlman, J. M., 61, 64, 1168
Pohjakallio, O., 351, 501, 587, 793, 1040
Poliščuk, M., 259
Pomme de Terre Fr., 651, 669
Pomus, M. I., 1512
Poole, W. D., 692, 834
Popow, G., 76
Porter, K. B., 1208
Portjanko, V. E., 559
Portjanko, V. F., 711
Portman, R. F., 575
Porzio Giovanoli, Elisa, 1429
Poschenrieder, H., 149
Power Farmer, 973
Powers, W. L., 1517
Powrie, J. K., 615
Prasad, M., 113
Prat, H., 344
Pratt, A. J., 650
Prettenhoffer, E., 956
Prevot, P., 601, 985
Price, C., 1368
Price, W. A., 90
Primost, Edith, 52
Probst, A. H., 594
Proc. internat. Seed Test. Ass., 370
Pruckova, M. G., 476
Purdue Univ. Agric. Exp. Sta., 84, 467, 599, 911, 912, 939, 1193, 1284, 1560
Purvis, O. N., 1269
Quackenbush, F. W., 1193
Quastel, J. H., 1582
Quinby, J. R., 565
Rabideau, G. S., 1295
Racicot, H. N., 210
Rademacher, B., 333, 337, 892
Raffensperger, E. M., 1291
Rajháthy, T., 1153
Ramiah, K., 947, 958
Rao, B. V., Venkata, 962
Rao, K., J., 616
Rapin, J., 1004, 1189
Rappe, G., 887
Raševskaja, V. F., 489
Raski, D. J., 1467
Raskin, S. E., 487
Rasmusson, J., 1019
Rataj, K., 1480
Ratcliff, R. Y., 834
Rattray, A. G. H., 542
Ravault, L., 240
Raychaudhuri, S. P., 1250
Ready, D., 519
Reath, A. N., 1353
Rebischung, J., 875
Reen, R. van, 929
Reestman, A. J., 1029
Reeves, J., 8, 127, 1223
Refai, F. Y., 503
Reisch, W., 610
Reith, J. W. S., 136
Reitz, L. P., 508
Repp, Gertraud, 1097, 1162
Republic of Ireland Minist. Agric., 428
Rhode Island Agric. Exp. Sta., 1300
Rice, J., 278
Riceman, D. S., 615
Rich, A. E., 670
Richardson, J. M., 766, 768
Richardson, L. T., 210, 215
Richards, P. W., 825
Riemsbijk, J. F., 1500
Riepma, P., 342, 829, 1330, 1521
Rietberg, H., 631
Rieuf, P., 118
Rijksinstituut Rassenonderz. Landbgewassen, Wageningen, 1026
Rio de Janeiro. Minist. Agric., 1458
Ripley, P. O., 1601
Ripper, W. E., 1132
Ririe, D., 1390
Ritcher, P. O., 981
Rivero, J. M. del, 702
Robbins, W. W., 1182
Roberts, H. A., 1530
Roberts, O., 1035
Robertson, D. W., 506, 1111
Robertson, L. S., 38, 71, 1280, 1363
Robinson, B. B., 1081
Robinson, D. B., 1418
Robinson, R. W., 243
Rodgers, A. D., 827
Rodgers, E. G., 93, 430, 923
Rodriguez, L. C., 1355
Roennebeck, W., 1426
Rogler, G. A., 1543
Roma, Sta. Chim.-agr. Sper., 99, 350 371
Rompietti, A., 595
Rosario, C. V., 1339
Rosbaco, U. F., 78
Rosen, H. R., 42
Rosser, D., 7
Rossman, E. C., 919
Rothamsted Exp. Sta., 769, 828
Rounce, N. V., 298
Rousseau, M., 73, 547
Roussel, N., 1366
Roux, A., 735
Rowaan, P. A., 299
Roy, M., 1101
Ruban, E. L., 780
Rudra, M. N., 165
Ruediger, W., 725
Ruether, H., 990
Ruffaldi, G. B., 873
Rusakova, A. A., 487
Russell, E. W., 775
Russell, M. B., 188
Russell, R. C., 67
Russell, R. S., 1278
Rutschky, C. W., 1291
Sahadevan, P. C., 1313
Sahasrabudhe, V. B., 1580
Šakirjjanov, S. Š., 812
Salamov, A., 1570
Šaldenkova, S. F., 498
Salni, L., 1490
Salzmann, R., 1424
Sampford, M. R., 379
Samuels, G., 108, 237, 696
Sande Bakhuyzen, H. L. van de, 829, 1558
Sanford, G. B., 198
Sanyal, A. T., 263, 1485
Saran, A. B., 113
Sarasola, A. A., 23
Sarlin, P., 743
Satarova, N. A., 460
Satyanarayanamurthy, K., 1051
Saubert von Hausen, S., 604
Sauger, L., 988
Sazanova, L. V., 285
Sazanov, V. I., 56
Scales, A. L., 1068, 1472
Schaaffhausen, R., 121
Schaaf, H. M., 1285
Schallock, D. A., 1191
Scheer, C. van der, 796
Scheffer, F., 802
Schendel, U. von, 853
Schiemann, E., 898
Schleusener, W., 1030
Schmidt, H., 1129
Schmidt, H. H., 1233
Schmittner, F., 1091
Schnelle, F., 792
Schrenk, W. G., 786
Schrimpf, K., 877
Schroedter, H., 1515
Schulenborgh, J. van, 1344
Schultz, E. S., 687
Schulze, W., 183
Schuster, M. L., 1384, 1385
Scotland Dep. Agric., 53, 1164, 1595
Scottish Agric., 1115
Scottish Pl. Breed. Sta., 1031
Scott, L. E., 695, 698
Scragg, E. B., 586, 1130
Scurti, Jole, 999
Seale, C. C., 1086, 1194
Sears, O. H., 148
Šebánek, J., 220
Séchet, J., 117
Seed World, 60, 146, 763
Selerud, Å., 1491
Sellschop, J , 288, 1303
Semkin, G , 1501
Semko, P , 1511
Senaratna, J. E., 1119
Sen Gupta, J. C., 1084
Seshadri Aiyangar, G., 1074
Shafer, N., 430
Shah, Z. H., 946
Shands, H. L., 900
Shaw, B. T., 815
Shaw, D. E., 1225
Shaw, E., 785
Shaw, W. C., 596, 834
Shellenberger, J. A., 1229
Shepherd, R. W., 726
Sherf, A. F., 205
Sherman, G. D., 1562
Sherman, P. J., 1304
Shibuya, M., 693
Shivapuri, T. N., 1232
Sidorin, M. I., 1545
Siegel, J. J., 153
Sierra Leone Dep. Agric., 439, 1196
Sigle, K., 217
Silva, A. R. da, 49

Silva Wahnon, J., 1358
Silvela, F. T., 1216
Silversides, W. H., 1481, 1601
Sim, J. T. R., 12
Simmons, R. O., 1193
Simon, E. W., 380, 1577
Simons, H. M., 698
Sinclair, A. T., 1600
Singh, D., 863
Singh, K., 847, 848, 849, 850, 851
Singh, M., 644
Singh, T. C. N., 1520
Singleton, W. R., 929
Sinha, R. P., 1232
Sinjagin, I. I., 184
Sisakjan, N. M., 1268
Sissingh, H. A., 1148
Sivadjian, J., 1547
Sivaraman, M. S., 1455
Skazkin, F. D., 517
Skogeley, C. R., 1191
Školjnik, M. Ja, 482
Skoog, F., 778
Skrdla, W. H., 1589
Skripčinskiĭ, V. V., 499
Slaats, M., 134
Sluijsmans, C. M. J., 1359
Slykhuis, J. T., 1237
Smianov, A. A., 1149
Smith, A. E., 772, 834
Smith, A. M., 816, 1333
Smith, F. G., 511, 1430
Smith, J. M., 1600
Smith, K. M., 1181
Smith, L., 354
Smith, O., 231, 234, 1122, 1191
Smith, P. G., 691
Smith, W. L., 226
Snowden, J. D., 821
Snyder, G. R., 1600
Soares, Telles, Inés P. de, 473
Soest, J. L. van, 413
Soil Sci. Soc. Florida, 1194
Somaliland Dep. Agric., 435
Soper, M. H. R., 608, 609
Sorteberg, A., 54
Šošič, B., 1209
Sousa, O. F. de, 733
South Africa Dep. Agric., 12, 21, 235
Southern Rhodesia. Dir. Res. and Special. Servs, 437
Southern Weed Contr. Conf., U.S., 834
South Pacific Commission, 841
Soyabean Dig., 1336, 1337
Spierings, F. H., 1044
Spindler, F., 311
Sprau, F., 1045
Sprenger, J. J. I., 101
Srinavasamurthy, T., 1310
Srinivasan, V., 616
Sta. Chim.-Agr. Sper., 99, 350, 371
Stafford, Helen A., 605
Stahler, L. M., 1181
Staniforth, D. W., 896
Stanjukovič, K. V., 885
Stanton, T. R., 886
Stapel, C., 180
Stapley, J. H., 1181
Statens Forsøgsvirk. Plantekult., Denmark, 227, 523, 531, 534, 623, 624, 639, 720, 723, 1055, 1212, 1252, 1265, 1266, 1272, 1488
Statens Jordbrförsok, Sweden, 1124, 1273
Staub, S., 1085
Steden, A., 1091
Steeves, T. A., 114
Steineck, O., 1038, 1039
Stephens, J. C., 565
Sterten, A. K., 457
Stevenson, E. E., 1335
Stevenson, F. J., 1420
Stewart, D., 1394
Stiles, W., 1548
Stockebrand, A., 1007
Stoner, W. M., 576
Stoner, W. N., 576
Stour, M., 1401
Strand, E., 524
Stryckers, J., 134, 338, 1231
Strzemska, J., 58
Subba Rao, M. S., 359
Subbiah, B. V., 361
Sudan. Minist. Agric., 434
Suggitt, J. W., 1128
Sulochana, C. B., 1461
Šurovenkov, B. G., 967
Sutter, R. de, 292
Svenson, B. G., 1063
Svenson, E., 1412
Sweden. Statens Jordbrförsok, 1124
Swenson, K. G., 1351
Switzer, C. M., 1601
Switzerland. Fed. Exp. Seed. Contr. Sta., 1189
Switzerland. Swiss Ass. Test. Distr. Seed Potatoes, 1598
Switzerland. Zürich-Oerlikon Fed. Exp. Sta., 1597
Talsma, T., 355
Talukdar, Sumitra, 268
Tamm, E., 125, 168, 189
Tanada, T., 1279
Tanaka, I., 1425
Tandon, R. K., 287
Tanganyika Dep. Agric., 838, 1453
Tanganyika Dep. Vet. Sci. Anim. Husb., 1200
Tanner, C. B., 308
Tarr, S. A. J., 416, 709, 1069, 1474
Taylor, A. L., 817
Taylor, F., 85, 555
Taylor, J. W., 858
Taylor, T. H., 1589
Tedin, O., 514
Telles, Inés P. de Soares, 473
Téllez, R. M., 474
Templeman, W. G., 1181
Terman, G. L., 1028, 1408, 1434
Terre Maroc., 550, 642
Teshima, S., 1270
Tessi, J. L., 535
Texas Agric. Exp. Sta., 1208
Thakur, C., 764
Theron, J. J., 1514
Thimann, K. V., 1431
Thomas, E., 127
Thomas, I., 2, 8, 1222, 1223
Thomas, Mary, 422
Thompson, A. E., 1299
Thompson, E. G., 174, 1211
Thompson, L. M., 1184
Thorpe, H. C., 862, 1220
Thorwall, S., 1445
Throneberry, G. O., 511
Tibbitts, T. W., 1601
Tidsskr. Planteavl, 582
Tilemans, E. M, 133
Tilt, J., 319
Timmons, F. L., 327
Tizio, R., 216, 1404
Todd, G. W., 674, 1433
Togari, Y., 1060
Tohoku Inst. Agric. Res., 1270, 1277, 1317, 1318, 1432
Toit, J. J. du, 235
Tolbert, H. E., 1589
Tomasello, R. P., 1194
Tombesi, L., 350, 371, 1015, 1549
Toniolo, L., 1017
Tourte, R., 943, 944, 978, 979, 987
Toxopeus, H. J., 167
Tremblay, F. T., 994
Trentin, A., 465
Trepačev, E. P., 282
Trevett, M. F., 1191
Trudova, R. G., 998
Trumble, H. C., 1589
Tsvetoukhine, V., 884
Tunçdilek, N., 295
Turner, R., 1409
Turrill, W. B., 406
Tweedsmuir, J., 809
Tyner, L. E., 67
Tyson, J., 747
Uganda Dep. Agric , 1198
Uhl, H., 1123
Ujvárosi, M., 1136
Ullstrup, A. J., 84
Ulonska, E., 525
Ulrich, A., 1393, 1397
U.N. Dep. Econ. Affairs, 1608
UNESCO, 393, 394, 405, 813, 814, 1171
U.S. Dep. Agric., 105, 858, 933, 934, 935, 936, 945, 948, 1053, 1081, 1104, 1602
U.S. N. Cent. Weed Contr. Conf., 343, 430, 1610
U.S. Northeastern Weed Contr. Conf., 1191, 1192
U.S. Southern. Weed Contr. Conf., 834
Univ. Coll. Wales, Dep. Agric. Econ., 390
Unterstenhoefer, G., 376
Urríes, M. J. de, 1236
Utkin, L. M., 1186
Valantin, G., 362
Valder, P. G., 1225
Vallega, J., 25
Van Alphen de Veer, E. J., 1522
Van Bavel, C. H. M., 309, 1581
Van Beukering, J. A., 314
Van den Berg, C., 300
Van den Brande, J., 208, 663
Van den Hende, A., 360
Van der Paau, F., 1254
Van der Scheer, C., 796
Vanderwalle, R., 22, 488
Van de Sande Bakhuyzen, H. L., 829, 1558
Van Dobben, W. H., 829, 1321
Van Doornik, A. W., 543
Van Duuren, A. J., 1013
Van Fraassen, A. M., 762
Van Geluwe, J., 893, 1191
Van Ginneken, P. J. H., 634
Van Hoek, C., 1172
Van Reen, R., 929
Van Schulenborgh, J., 1344
Van Soest, J. L., 413
Van Vuren, J. P. J., 187
Van Wyk, S. P., 100
Vasiljeva, N. G., 1247
Vasjko, N. D., 172

Vasudeva, R. S., 202, 494, 657
Velasco, J. R., 961
Vengris, J., 1537
Venkata Rao, B. V., 962
Venkataratnam, L., 1051
Vergnano, O., 1261
Verhoeven, B., 301
Vermeulen, F. H. B., 1579
Vernet, A., 852
Verona, O., 673
Vervelde, C. J., 874
Verwaest, J., 74
Vianna e Silva, M., 953
Vicini, L., 1012
Vidal, A. A., 1559
Viegas, G. P., 963
Vieitez, E., 94
Vine, H., 1513
Vink, A. P. A., 1522
Vinogradov, P. V., 106
Virri, T. J. 865
Virtanen, A. I., 604
Visser, W. C., 294
Vlasjuk, P. A., 1024, 1108
Vlitos, A. J., 1553, 1574
Voevodin, A. V., 774
Vogler, E., 1566
Voĭtčišin, N. V., 477
Volesky, E., 1479
Volkov, S. T., 967
Von Archimowitsch, A., 654
Von Hofsten, C. G., 1534
Von Irion, W., 1415
Von Lenhard, G., 1567
Von Schendel, U., 853
Von Zeller, A., 1555
Vovčenko, I. V., 530
Vradenburg, G. A., 330
Vries, D. M. de, 829
Vuren, J. P. J., van, 187
Wadleigh, C. H., 1365
Wageningen. COCOBRO Inst., 1235, 1240, 1241, 1242, 1243, 1244, 1558
Wageningen. Rijksinst Rassenonderz. Landbgewassen, 1026
Wager, H. G., 225
Wahhab, A., 946
Wahlin, B., 1057
Wahnon, J. S., 1358
Wales. Univ. Coll., Dep. Agric. Econ., 390
Walker, A. C., 1371, 1399
Walker, A. J. K., 466
Walker, J. C., 417
Wallace, H. A. H., 480
Walter, M. W., 1102
Warren, J. C. R., 1600
Wassink, E. C., 796
Watson, D. J., 633, 769, 1389, 1589
Watson, D. P., 163
Watson, I. A., 863
Watson, Marion A., 828, 1389
Wauthy, R., 1366
Weatherhead, T. D., 1089
Weaver, N., 257
Weber, J. R., 262
Weibull, G., 964
Weijer, J., 1282
Weiss, M. G., 593
Wellhausen, E. J., 918
Wellington, P. S., 367
Wells, A. J., 1170
Welsh Agric. Land Sub-Comm., 291
Wene, G. P., 940
Went, F. W., 1568
Wenzl, H., 1037, 1417
West E., 1194
Western Australia Trustees of the Wheat Pool, 1
Westmorland, W. G., 1345
West Scot. Coll. Agric., 806, 1409
White, G. L., 834
White, M., 243
Whittenberger, R. T., 228
Whyte, R. O., 424
Wiancko, M. R., 1600
Wiant, J. S., 211,
Wickens, G. M., 1070
Widiez, F., 1312
Wiechers, S. G., 1172
Wilbur, D. A., 1253
Wilcox, Marguerite S., 697
Willard, C. J., 150, 817, 1601
Willemsen, W., 310
Williams, A. H., 575
Williams, C. H., 516
Williams, J. H., 1263
Williams, K. T., 1319
Williamson, T. W., 321
Willis, G. H., 589
Willis, S. J., 1525
Wilson, E. V. B., 427
Wilson-Jones, K., 104
Wilson, J. S., 1600
Wilson, S. L., 783
Wilson, T. V., 309
Wilten, W., 831
Wit, C. T. de, 355
Wittenrood, H. G., 829, 1240, 1244
Wittingham, C. P., 356
Wittwer, S. H., 1353, 1400
Wolf, D. E., 430
Wolfe, T. K., 1588
Wolf, M. J., 98
Woodham, K. M., 1516
Woodruff, N. P., 1118
World Crops, 1507
Wort, D. J., 1332, 1601
Wraae-Jensen, H., 1374
Wright, N. C., 745
Wuenscher, C., 679
Wyk, S. P. van, 100
Wylie, J. C., 1156
Wyllie, J., 1496
Yamamoto, K., 1277, 1432
Yates, F., 400
Yeo, Margarite L., 424
Young, D. W., 975, 1127, 1601
Young, M. T., 1473
York, J. O., 42
Zaĭcev, V., 1082
Zandstra, K. J., 829
Zarubaĭlo, T. Ja., 28
Zdriljko, A. F., 868
Zeeuw, D. J. de, 993
Zelenskiĭ, M. A., 19
Zelitch, I., 977
Zeller, A. von, 1555, 1596
Zieriacks, H., 348
Zimmerman, P. W., 373
Zingg, A. W., 1118
Zogg, H., 1597
Zubatova, L., 51
Zur Burg, F. W., 1194
Zürich-Oerlikon Fed. Exp. Sta., 1597
Zuur, A. J., 305
Zweifel, J., 861